

February 8, 2011

Dear Joint Committee for Review of Administrative Rules:

I am in favor of suspending the Wind Siting Rules. To ensure citizen's property rights, the setbacks from wind turbines should be a minimum of 1800' from a property line. Without these adequate setbacks from property lines, wind turbines will restrict economic development in the State of Wisconsin. This would be a JOBS KILLER! I've also attached a report that talks about how renewable energy will increase utility bills and what renewable energy will really cost Americans.

Please SUSPEND the Wind Siting Rules.

Sincerely,

A handwritten signature in black ink, appearing to read "Daryn & Martha Woelfel". The signature is fluid and cursive, with the names "Daryn" and "Martha" written in a larger, more prominent script than "Woelfel".

Daryn & Martha Woelfel

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A REPORT OF THE HERITAGE CENTER FOR DATA ANALYSIS

**A RENEWABLE ELECTRICITY STANDARD:
WHAT IT WILL REALLY COST AMERICANS**

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WILLIAM W. BEACH, BEN LIEBERMAN, AND NICOLAS D. LORIS**

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A RENEWABLE ELECTRICITY STANDARD: WHAT IT WILL REALLY COST AMERICANS

DAVID W. KREUTZER, PH.D., KAREN A. CAMPBELL, PH.D.,
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Abstract: Renewable energy—harnessing the power of the wind and the sun—sounds wonderful until confronted with the facts. While wind and sun are indeed free, turning their energy into consumer-accessible electricity is not. Nor is it easy. Wind power must be used at the moment the wind is blowing—which it generally does not do during blazing-hot summer days, the peak of electricity use. Both solar and wind power require costly installations and transmission mechanisms. Instead of saving money for Americans, renewable energy sources are much more likely to spike their utility bills. Nevertheless, Congress is considering a mandate for a nationwide renewable electricity standard (RES). Heritage Foundation energy policy experts explain why an imposed national RES would be bad for families, bad for business, and bad for the economy.

Congress is once again considering major energy legislation, focused largely on promotion of energy sources that produce few or no greenhouse gases. This current concentration on promoting so-called renewable energy sources assumes that congressional action now will lead to such significant growth in renewable energy sources that the use of carbon-based energy will subside, thus reducing the expansion of atmospheric carbon dioxide and other global warming gases.

Congress's effort to expand renewable energy sources starts from a relatively meager production base. Nearly half of America's electricity is generated from coal, with natural gas and nuclear energy adding about 20 percent each.¹ Most of the rest is provided by renewable sources, primarily hydroelectric energy at 6 percent. Non-hydro renewables like wind and solar energy and biomass total only 3 percent.

For many years, federal energy and environmental policy has nudged production of some electricity sources over others, either through "sticks," such as costly air quality regulations targeting coal, or through "carrots" like tax credits and subsidies for wind. Proposed global warming legislation would alter the electricity mix to an unprecedented degree by putting a price on emissions of greenhouse gases, chiefly carbon dioxide from fossil fuel combustion. Coal is the most carbon-intensive energy source, and any stringent cap-and-trade provisions would significantly curtail its use in favor of other sources in the decades ahead. Such legislative measures, however, are very costly,² and the prospects for passage in 2010 are uncertain.

Congress is also considering achieving similar but less ambitious goals via a renewable electricity

1. U.S. Energy Information Administration, "Figure ES 1. U.S. Electric Power Industry Net Generation," January 21, 2010, at <http://www.eia.doe.gov/cneaf/electricity/epa/figes1.html> (April 29, 2010).

standard (RES). Twenty-nine states have versions of an RES, but Washington is considering a nationwide standard. Under this mandate, a growing percentage of electricity would have to be produced by approved renewable energy sources. Much of the RES would be met with increased energy generation from wind turbines.

It stands to reason that an RES would raise electricity prices. After all, if electricity created by wind and other renewables were cost competitive, consumers would use more of it without a federal law to force consumption. Recent experience with the mandate for renewable fuels like corn ethanol also suggests significant cost increases as well as technical shortcomings.³

While proponents argue that wind is free, harnessing it into useful electricity certainly is not. However, the question of how much an RES will affect electric bills does not have a straightforward answer.

Perhaps easiest to calculate is the direct cost of purchasing, installing, and operating the increasing number of wind turbines needed to meet the RES. A bit murkier are questions about the costs of the necessary additional transmission lines to deliver the electricity from where it is generated—the most desirable sites for wind are often remote mountain ridges or sparsely populated plains—to the cities where it is needed.⁴ The economics of an RES is further complicated by the legal and administrative objections to establishing appropriate sites for wind farms and transmission lines,

which already are quite common and would only grow with an RES.⁵

It is particularly difficult to take into account the substantial costs created by the intermittent and unreliable nature of wind. Simply put, the wind does not always blow, and it is difficult to predict and impossible to control. Given the need for electricity 24 hours a day seven days a week and the reality that times of peak demand—hot summer days—are precisely when the wind is usually still, a mandate for increased wind-generated energy is also a mandate for increased non-wind backup systems for balancing wind fluctuations.⁶ In effect, increased wind power cannot simply be added to the existing grid without transforming the grid in ways that introduce both significant costs and operational inefficiencies.

These shortcomings will not be overcome through increases in scale. Connecting a large number of widely dispersed wind farms to the grid will not smooth the overall supply enough to make balancing unnecessary. Though variability can be reduced, a recent analysis states, “These results do not indicate that wind power can provide substantial baseload power simply through interconnecting wind plants.”⁷

There are federal studies of the costs of an RES that conclude that it would add no more than a few percent to electric rates,⁸ but these studies do not take the full cost of wind and other renewables into account. This Center for Data Analysis (CDA) Report

2. For analysis of the Lieberman–Warner bill, see William W. Beach, David W. Kreutzer, Ben Lieberman, and Nicolas D. Loris, “The Economic Costs of the Lieberman–Warner Climate Change Legislation,” *Heritage Foundation Center for Data Analysis Report No. CDA08-02*, May 12, 2008, at <http://www.heritage.org/Research/Reports/2008/05/The-Economic-Costs-of-the-Lieberman-Warner-Climate-Change-Legislation>. For analysis of the Waxman–Markey bill, see David W. Kreutzer, Karen A. Campbell, William Beach, Ben Lieberman, and Nicolas Loris, “The Economic Consequences of Waxman–Markey: An Analysis of the American Clean Energy and Security Act of 2009,” *Heritage Foundation Center for Data Analysis Report No. CDA09-04*, August 6, 2009, at <http://www.heritage.org/Research/Reports/2009/08/The-Economic-Consequences-of-Waxman-Markey-An-Analysis-of-the-American-Clean-Energy-and-Security-Act-of-2009>. For analysis of the Boxer–Kerry bill, see David W. Kreutzer, Karen A. Campbell, William W. Beach, Ben Lieberman, and Nicolas D. Loris, “What Boxer–Kerry Will Cost the Economy,” *Heritage Foundation Backgrounder No. 2365*, January 26, 2010, at <http://www.heritage.org/Research/Reports/2010/01/What-Boxer-Kerry-Will-Cost-the-Economy>.
3. Ben Lieberman and Nicolas Loris, “Time to Repeal the Ethanol Mandate,” *Heritage Foundation WebMemo No. 1925*, May 15, 2008, at <http://www.heritage.org/Research/Reports/2008/05/Time-to-Repeal-the-Ethanol-Mandate>.
4. Joint Coordinated System Plan, *Report: Joint Coordinated System Plan '08*, 2008, at <http://www.jcspstudy.org/> (April 30, 2010).
5. U.S. Chamber of Commerce, “Project No Project: Energy—Back on Track,” at <http://pnp.uschamber.com/> (April 30, 2010).
6. Robert J. Michaels, “A Federal Renewable Electricity Requirement,” *Cato Institute Policy Analysis No. 627*, November 13, 2008, at http://www.cato.org/pub_display.php?pub_id=9768 (April 29, 2010).
7. Warren Katzenstein, Emily Fertig, and Jay Apt, “The Variability of Interconnected Wind Plants,” *Energy Policy*, April 18, 2010, at <http://www.citeulike.org/user/LondonAnalytics/article/7052831> (April 29, 2010).

provides such a comprehensive economic analysis.

CDA analysis projects that an RES as outlined below would:

- Raise electricity prices by 36 percent for households and 60 percent for industry;
- Cut national income (GDP) by \$5.2 trillion between 2012 and 2035;
- Cut national income by \$2,400 per year for a family of four;
- Reduce employment by more than 1,000,000 jobs; and
- Add more than \$10,000 to a family of four's share of the national debt by 2035.

COMPARING THE COSTS OF WIND AND COAL

The flow of wind is erratic and uncertain, which means that so is the power generated from wind. This unreliable nature is especially problematic when wind is used to generate utility-scale electricity for the power grid.

Keeping line quality, primarily voltage and frequency, within the necessarily close tolerances requires constant monitoring of demand and the constant monitoring and adjustment of supply.⁹ Even under the best of circumstances, these adjustments require a certain fraction of power to be delivered from generators that can be ramped up and down rapidly. For the most part, this easily ramped electricity comes from natural-gas fired turbines that are relatively expensive to operate compared to a baseload source such as coal, nuclear, or natural-gas combined-cycle power plants.

Though coal, nuclear, and gas combined-cycle power plants are much more sluggish in response to changing demand, their dependability is very high. Indeed, their output can be matched to size-


The High Cost of Renewable Energy Systems

Using wind and solar energy systems to provide 100 percent of electricity could double or triple household electric bills.

Average Electricity Bill for a Family of Four, by Energy Source

| Energy System | Costs | |
|--------------------|----------|------------|
| | Monthly | Annually |
| Coal | \$188.66 | \$2,263.90 |
| On-shore wind | \$339.58 | \$4,075.02 |
| Off-shore wind | \$403.65 | \$4,843.75 |
| Solar thermal | \$504.03 | \$6,048.34 |
| Solar photovoltaic | \$717.82 | \$8,613.85 |

Sources: Heritage Foundation calculations, and U.S. Energy Information Administration, "2016 Levelized Cost of New Generation Resources from the Annual Energy Outlook 2010," at http://www.eia.doe.gov/oiia/aeo/electricity_generation.html (March 30, 2010).

Chart 1 • CDA 10-03  heritage.org

able, expected changes in demand when given sufficient lead time. Wind energy plants do not have this ability by themselves, so direct comparisons of wind costs per kilowatt hour to coal or gas costs are misleading.

Further, location choices for fossil and nuclear-fueled power plants have much greater latitude than those for wind turbines, which, like hydropower plants, must be located where the natural resource is best suited—not necessarily close to where the power is used. This feature adds additional transmission costs to wind energy.

With nuclear power not considered to be renewable, the least-cost renewable source for electricity is onshore wind. In an early-release version of its "Annual Energy Outlook 2010," the Energy Information Administration (EIA) lists the levelized costs of various sources of electricity projected for 2016 (in 2008 dollars).¹⁰

The EIA levelized costs per megawatt hour are \$78.10 for conventional coal power,¹¹ \$149.30 for onshore wind power, \$191.10 for offshore wind power, \$396.10 for photo-voltaic solar

- U.S. Energy Information Administration, "Impacts of a 25 Percent Renewable Electricity Standard as Proposed in the American Clean Energy and Security Act Discussion Draft," April 2009, at [http://www.eia.doe.gov/oiia/service/pt/acesa/pdf/sroiaf\(2009\)04.pdf](http://www.eia.doe.gov/oiia/service/pt/acesa/pdf/sroiaf(2009)04.pdf) (April 29, 2010).
- Electrical appliances operate on alternating current, which requires that all generators in the grid turn at the same frequency and be perfectly synchronized. Further, appliances are designed to operate at particular voltages. Exceeding the tolerances for these voltages, either too high or too low, can cause serious damage to the equipment.
- U.S. Energy Information Administration, "2016 Levelized Cost of New Generation Resources from the Annual Energy Outlook 2010," at http://www.eia.doe.gov/oiia/aeo/electricity_generation.html (April 29, 2010).

power, \$256.60 for thermal solar power, and \$139.50 for power generated by natural-gas conventional turbines.

Even though the \$149.30 for the cheapest renewable power is already well above the cost of conventional power sources, it does not include any adjustment for reliability or additional transmission costs.

Wind cannot be turned on and off to match changes in demand. There are no feasible energy storage options for most wind farms. So, unlike power from conventional sources, wind power must be used when the wind is actually blowing.

Geography puts wind at another disadvantage. To keep the cost of wind power as low as possible, it is necessary to locate the wind farms in areas with the strongest and steadiest winds. As is the case with solar power, many of the best areas for wind power are located far from the major population centers. This requires construction of new, high-capacity transmission lines. A review of transmission costs suggests a median cost of \$15 per megawatt hour.¹²

The dependability problem is more complicated. Power-grid management requires constant and instantaneous balancing of supply and demand. Sophisticated analysis and long experience guide grid operators as they schedule the various sources of generation. Nevertheless, there will still be unanticipated changes in both supply and demand; further, there can be variations in demand that cannot easily be matched by the most efficient conventional sources (coal, nuclear power, and integrated combined-cycle gas) even if they are anticipated. The most common energy source for balancing these very short-run changes is natural gas turbines, which are less efficient than coal, nuclear power, or natural gas combined cycle.

Wind, like solar energy, is not a dispatchable power source; that is, it cannot be turned on at will. As a result, increasing dependence on wind adds variability and uncertainty to the power grid that must be offset by quick-ramping power sources like natural gas turbines to maintain a relatively constant flow of electricity.

This increased reliance on natural gas turbines comes from two sides of the balancing equation. When there is an unanticipated decline in wind generation, or when the decline is anticipated but is for too short a period to balance with coal, natural gas turbines fill the gap. On the other hand, when wind generation is low compared to capacity, there is need for power sources that can be quickly ramped down. In this case, there would be additional need for natural gas generation so that unanticipated increases in wind power can be accommodated by rapidly cutting power from the natural gas turbines.

Gas turbines are not a renewable energy source, so swapping a megawatt hour of wind power for a megawatt hour of coal power also requires swapping power from natural gas turbines for additional coal. Since coal power is cheaper than power generated by natural gas turbines, the difference must be added to the cost differential between wind and coal.

There is little research directly addressing the question of how much additional gas-turbine power will be needed. The theoretical limits are zero (all fluctuations are perfectly anticipated and balanced with the cheapest coal power) and the inverse of the capacity factor, which would imply three megawatt hours of additional gas-turbine power for every megawatt hour of wind power.¹³ In theory, this could add as much as \$179 per megawatt hour to the cost of wind power.

11. To adjust for regulatory uncertainty, the EIA added a premium to the capital cost for coal power plants. The EIA said that the premium has a cost impact similar to a \$15 per ton tax on CO₂ emissions. This would raise the cost of coal power by \$22.30 per megawatt hour. Since CDA analysts are interested in comparing the cost of electricity generated with coal and without CO₂ regulations to the cost under a renewable energy standard, the cost associated with the capital premium has been deducted here.
12. Andrew Mills, Ryan Wiser, and Kevin Porter, "The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies," Ernest Orlando Lawrence Berkeley National Laboratory, February 2009, at <http://eetd.lbl.gov/ea/emp/reports/lbnl-1471e.pdf> (April 29, 2010).
13. The capacity factor is the ratio of a generator's actual energy production for a year to its maximum potential production. The projected capacity factors are 34 percent for wind, 85 percent for coal, 87 percent for natural gas combined cycle, 90 percent for nuclear power, and 30 percent for natural gas turbines. These different capacity factors have already been incorporated into the EIA's levelized costs.

A study done for the National Renewable Energy Laboratory indicates that the spinning reserves must be increased about 0.2 megawatt capacity for each megawatt of wind power.¹⁴ “Spinning reserves” describes the power plants that must be warmed up and synchronized with the grid so that they can be brought online more quickly. They use fuel, but not as much as when they are called upon to supply power to the grid.

This measure is somewhat different from the necessary increase in actual gas-turbine electricity production, but it is very much related to the uncertainty and variability problem. Though 0.2 megawatt per hour may be a significant underestimate for the amount of additional gas-turbine power, it is the factor employed for this analysis. That is, for every megawatt hour of wind that is substituted for coal power, an additional 0.2 megawatt hour of gas-turbine power must be substituted for coal as well. Using this ratio adds \$12 per megawatt hour instead of the theoretical maximum of \$179 per megawatt hour to the cost of wind power.

After making these adjustments for transmission costs and additional gas-turbine generation, the cost of an additional megawatt of onshore wind power is \$177 per hour. This is 126 percent above the cost of a megawatt of coal power per hour.

Put another way, the electric bill for a typical family of four would be \$189 per month if it was powered entirely by coal, but it would rise to \$340 per month if it was supplied entirely by onshore wind power.¹⁵

Since onshore wind is the least expensive of the renewable electricity sources (ruling out conventional hydro and nuclear power), any plan that uses the more expensive renewable sources—such as offshore wind (\$218 per megawatt hour); thermal solar power (\$284 per megawatt hour); or photovoltaic solar power (\$423 per megawatt hour)—would have even greater costs. As the mandated

renewable-fraction of electric power rises, so does the average cost of electricity.

Chart 1 shows the hypothetical family-of-four electric bill for different sources of electric power. Though former Vice President Al Gore has suggested moving the country entirely to renewable electricity generation in 10 years, few if any legislative proposals seek complete dependence on renewables. Nevertheless, Chart 1 illustrates the large cost differences between the cheaper conventional energy sources and various renewable energy sources.

With a standard that requires only a fraction of electricity to be generated by renewable sources, the adverse impact on electric bills will be diluted as the higher cost of renewable electricity is averaged with the lower-cost conventional power. However, as the relative amount of wind power grows, the impact on electricity prices grows as well.

A RENEWABLE STANDARD

Renewable energy standards typically stipulate a timeline of minimum levels of electricity that must be met by approved renewable sources. Usually, these minimum levels are expressed as a fraction of total electricity generation for each year.

For the purposes of this study, the RES starts at 3 percent for 2012 and rises by 1.5 percent per year. This profile mandates a minimum of 15 percent renewable electricity by 2020, a minimum of 22.5 percent by 2025, and a minimum of 37.5 percent by 2035, which is the end year for this analysis.

CDA analysts assume that the higher costs of the renewable power are averaged in with the lower costs of conventionally generated power so that within each of the sectors (industrial, commercial, and residential), all customers pay the same price per kilowatt hour. Further, for the purposes of this analysis, prices do not vary from one part of the country to another. In reality, an RES will have differential impacts from one market to another. In general, smoothing adverse impacts in economic

14. EnerNex Corporation, “Eastern Wind Integration and Transmission Study: Executive Summary and Project Overview,” prepared for the National Renewable Energy Laboratory, January 2010, at http://www.nrel.gov/wind/systemsintegration/pdfs/2010/ewits_executive_summary.pdf (April 29, 2010).

15. These numbers are based on the cost of substituting wind for coal, which requires additional natural-gas turbine power for balancing. It would be virtually impossible, and therefore much more expensive, to provide power that is generated entirely by wind farms. The average markup from cost to retail is assumed to be \$45 per megawatt hour. The average consumption is derived from U.S. Energy Information Administration, “Table 5: Average Monthly Bill by Census Division, and State 2008,” at <http://www.eia.doe.gov/cneaf/electricity/esr/table5.html> (April 29, 2010).

analysis reduces overall costs. So although the analysis may blur the pattern of economic distress, it is unlikely to have overestimated it.

ECONOMIC RESPONSES

When the cost of any commodity rises, actors in the economy respond in uncounted ways to offset the impact. Though specific responses cannot be predicted, general patterns and magnitudes can be estimated from past responses to price changes.

Electricity prices have risen and fallen over the decades, and businesses and households have adjusted. The adjustments can be as routine as parents reminding their children to turn off the lights or as entrepreneurial as an engineer setting up a firm to develop new technology. When electricity prices rise, heat-pump salespeople are more likely to emphasize the advantages of their more efficient (and more expensive) models; producers of electronic controls will see a greater market for programmable thermostats; people will turn down the thermostat and be more inclined to buy Energy Star-rated appliances.¹⁶ These impacts and more are reflected in the complex system of equations that have been estimated for the macroeconomic model and are reflected in the coefficients of the smaller energy model employed to estimate initial electricity price effects.¹⁷

Even when averaging the cost of the mandated renewable electricity with the cheaper conventionally sourced electricity, the price rises are noticeable. For residential consumers, the price increases start small (because the renewable mandate starts at only 3 percent), but by 2035, the price rises 36 percent above the baseline price. Forced to pay higher prices, households cut electricity use by 19 percent. Even after these consumption cutbacks, a family of four will see its annual electric bill rise by over \$300.

Because the cost of generation is a bigger fraction of the industrial electricity price than of the residential electricity prices, the RES causes a bigger percentage increase in industrial electricity prices than in residential electricity prices. The price increase is 5 percent in 2012 and rises to 60 percent in 2035. The higher prices force cutbacks in consumption that reach 23 percent below baseline in 2035. The net impact in 2035 is that industrial users will pay out 21 percent more dollars for 23 percent less electricity than if there were no RES.

Electric power is one of the most critical inputs to a modern economy. Thus, it is no surprise that forcing the cost of electricity to rise dampens economic activity. The cost increase for electricity can be viewed as a particularly damaging energy tax, because a renewable mandate, unlike the case of a normal tax, provides no revenue to at least partially offset the higher cost. By way of comparison, the highway use tax on gasoline raises the price of gasoline, but it also generates revenues for building and maintaining roads and bridges.¹⁸ On the other hand, a renewable energy standard raises costs in the form of less efficient production, which provides no economic benefit.

As an analogy, suppose a farmer is able to produce 10,000 bushels of wheat per year with the aid of irrigation from a nearby river. If a regulation prohibiting irrigation cuts production to 9,000 bushels, then, to the farmer, this is the same as a 10 percent tax. However, with an actual tax, the government would have 1,000 bushels to distribute, while with the prohibition on irrigation, those bushels simply disappear—providing benefits to no one.

THE MACROECONOMIC IMPACTS

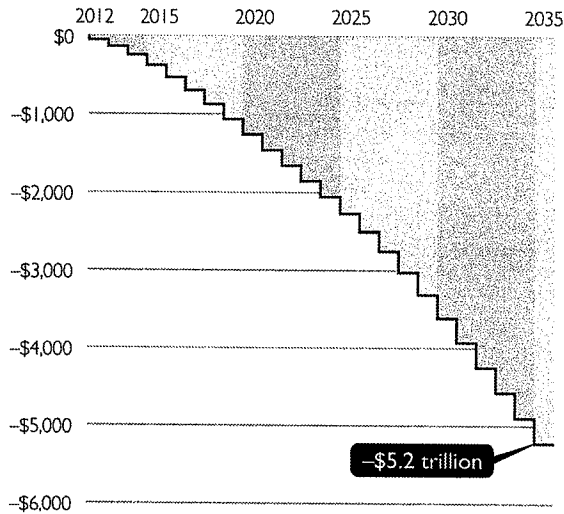
Analysis of cap-and-trade bills that impose economy-wide reductions in CO₂ emissions shows over-

16. For evidence that consumers are sensitive to and aware of differences in appliance efficiencies, see the surveys done for the EPA's Energy Star program. These surveys show that a large majority of households consider the Energy Star rating when purchasing an appliance. For the 2009 survey, see Energy Star, "National Awareness of Energy Star for 2009," at <http://www.energystar.gov/ia/partners/publications/pubdocs/National%20Awareness%20of%20ENERGY%20STAR%202009.pdf> (April 29, 2010).
17. See the Appendix to this report for a description of the CDA Energy Model and the IHS Global Insight U.S. Macroeconomic Model used to estimate the economic effects of RES.
18. In fact, however, these taxes are increasingly diverted to other uses. For a discussion of this diversion, see Wendell Cox and Ronald D. Utt, "Federal Transportation Programs Shortchange Motorists: Update of a USDOT Study," Heritage Foundation *Background* No. 2283, June 8, 2009, at <http://www.heritage.org/Research/Reports/2009/06/Federal-Transportation-Programs-Shortchange-Motorists-Update-of-a-USDOT-Study>.

Renewable Energy Standards: A \$5.2 Trillion Burden

Renewable energy standards would reduce annual GDP by an average of \$218 billion by 2035.

Cumulative Change in GDP Due to Renewable Energy Standards, in Billions of Inflation-Adjusted Dollars



Source: Heritage Foundation calculations using data from the IHS Global Insight U.S. macroeconomic model.

Chart 2 • CDA 10-03 heritage.org

all losses to the economy of \$5 trillion to nearly \$10 trillion between 2012 and 2035.¹⁹ Though renewable energy standards apply only to the power sector (electricity generation), they provide less flexibility in meeting the goals than does cap-and-trade and can lead to losses of the same order of magnitude as the more comprehensive cap-and-trade regulations.

The broadest measure of a country's economic activity is gross domestic product (GDP). As the mandated level of renewable energy rises over time, so does the cost of electricity and so do the losses imposed on the economy. Compared to the no-RES baseline, GDP drops by \$50 billion in 2012. The annual losses increase to \$197 billion by 2020, \$300 billion in 2030, and more than \$325 billion in 2035. Summing up the impacts for 2012 to 2035 yields a total loss of \$5.2 trillion. All of these impacts are adjusted for inflation to 2010 dollars.

On a family-of-four basis, this lost income averages over \$2,400 per year.

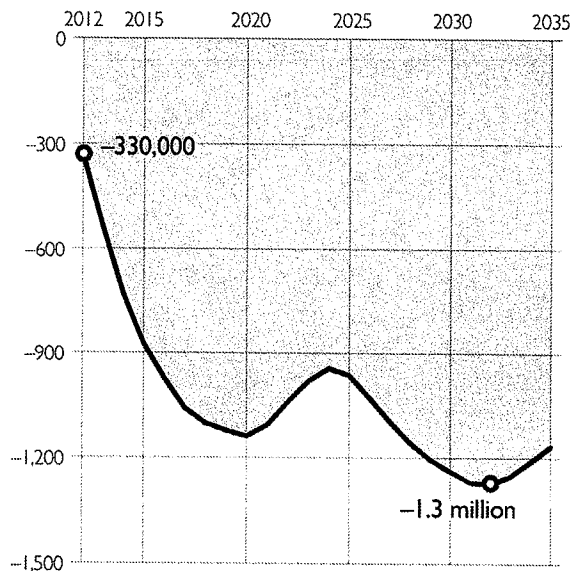
When the economy is shocked by the higher electricity prices, employment declines. In the first year (2012), employment drops 330,000 jobs below the baseline level. The battle between market adjustments and ever-rising electricity prices leads to periods of growing job losses interspersed with periods of relative stability. However, by 2017, employment falls 1,000,000 jobs below the baseline and at times is more than 1.2 million jobs below the baseline. On average, there will be 1,000,000 fewer people working with the RES in effect than if there were no RES.

Falling incomes and rising unemployment squeeze government finances from two sides: Tax

Renewable Energy Standards Would Eliminate Millions of Jobs

By 2012, renewable energy standards would have cost the U.S. more than 300,000 jobs. The total fluctuates and would reach 1.3 million by 2032.

Change in Employment Due to Renewable Energy Standards, in Thousands of Jobs



Source: Heritage Foundation calculations using data from the IHS Global Insight U.S. macroeconomic model.

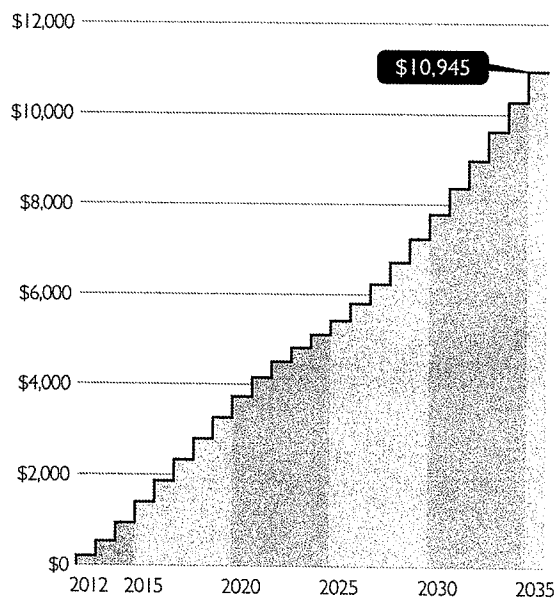
Chart 3 • CDA 10-03 heritage.org

19. See, Beach *et al.*, "The Economic Costs of the Lieberman-Warner Climate Change Legislation."


Renewable Energy Standards Would Increase the Federal Deficit

By 2035, a family of four would see its share of the federal deficit increase to nearly \$11,000.

Cumulative Change to a Family of Four's Share of the Federal Deficit Due to Renewable Energy Standards



Source: Heritage Foundation calculations using data from the IHS Global Insight U.S. macroeconomic model.

Chart 4 • CDA 10-03  heritage.org

revenues fall, and expenditures on such things as unemployment insurance rise. These two responses cause federal deficits to grow even faster than they are already projected to grow. The RES will add over \$10,000 to a family of four's share of the national debt by 2035.

CONCLUSION

Mandating that an ever-increasing fraction of electrical power must be generated from renewable

sources will raise the cost of electricity, force inconvenient and painful cuts in electricity use, and damage the economy. Households will see their electricity prices rise 36 percent by 2035, while industrial users will see their electricity prices rise 60 percent even after adjusting for inflation.

Since virtually every product and service depends on electricity to some extent, these price increases have pervasive impacts. Compared to projected levels without the RES, economic activity falls by \$5.2 trillion, which is an inflation-adjusted average annual loss of \$218 billion, or more than \$2,400 per family of four each year.

Declining economic activity is bad for employment. Implementing the RES cuts jobs. Compared to baseline projections (that is, without the RES), employment averages 1,000,000 jobs below the baseline projection.

Though the source of wind and solar energy is free, power delivered from these sources is very expensive. For now at least, onshore wind is the cheapest renewable energy source that can be scaled in significant fashion. But scaling up wind power simply lays bare the costly nature of harnessing wind and magnifies the economic losses. A renewable electricity standard is not a path to the new economy, but an example of the stale old thinking that will hobble the already damaged economy with job-killing cost increases.

—David W. Kreutzer, Ph.D., is Research Fellow in Energy Economics and Climate Change in the Center for Data Analysis; Karen A. Campbell, Ph.D., is Policy Analyst in Macroeconomics in the Center for Data Analysis; William W. Beach is Director of the Center for Data Analysis; Ben Lieberman is Senior Policy Analyst in Energy and the Environment in the Thomas A. Roe Institute for Economic Policy Studies; and Nicolas D. Loris is a Research Assistant in the Roe Institute at The Heritage Foundation.

APPENDIX METHODOLOGY

As described in the section “Comparing the Costs of Wind and Coal,” CDA analysts calculated the increase in the cost of wind power per megawatt hour. This cost is then translated to that for 1 percent of base-year power production. This 1 percent cost is multiplied by the RES percent for each year, and an average price increase is calculated from that. The price increases are then passed on to the macroeconomic model.

MACROECONOMIC SIMULATION OVERVIEW

Heritage analysts used the IHS Global Insight long-term macroeconomic model of the U.S. economy to estimate the effects of the Clean Energy Jobs and American Power Act (S. 1733) on the overall economy.²⁰ The simulation was implemented by changing variables in the macroeconomic model according to the changes predicted by a microeconomic model of the energy sector maintained by the CDA (see above). In order to estimate the policy impact, two main pieces needed to be simulated: price effects and energy efficiency effects.

The energy model estimated the change in energy production prices and retail energy prices that would result from changing the production mix from renewable energy and traditional energy sources. These prices were matched with their corresponding variables in the macroeconomic model to estimate the effect that these price changes would have on the economy overall.

The energy model projects changes in fuel efficiency and changes in total highway fuel consumption. Corresponding macro-model variables were changed. The effect of these changes helps to mitigate some of the total increased consumer expenditure on fuel.

The macroeconomic model does not have specific variables corresponding to alternative renewable fuel sources as does the CDA energy model. The macroeconomic simulation takes into account the increase in domestic alternative fuel source supply by adjusting the variable amount of residual energy demand that affects the amount of imported energy.

20. The February 2010 long-term baseline is used for this analysis. Heritage analysts relied on models maintained by IHS Global Insight, Inc., in developing the economic estimates reported in this paper. The IHS Global Insight model is used by private-sector and government economists to estimate how changes in the economy and public policy are likely to affect major economic indicators. The methodologies, assumptions, conclusions, and opinions presented here are entirely the work of analysts at The Heritage Foundation's Center for Data Analysis. They have not been endorsed by, and do not necessarily reflect the views of, the owners of the IHS Global Insight model. See “Description of the Global Insight Short-Term U.S. Macroeconomic Model,” at http://www.heritage.org/About/Staff/Departments/Center-for-Data-Analysis/~media/CDA/CDA_models_data/globalinsightmodel.ashx.

The Effect of Renewable Energy Standards: Key Indicators

Gross Domestic Product

In Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|---------|
| 2012 | 14,089.13 | 14,135.49 | -46.36 |
| 2013 | 14,544.08 | 14,618.10 | -74.02 |
| 2014 | 14,917.95 | 15,017.31 | -99.36 |
| 2015 | 15,262.91 | 15,382.46 | -119.54 |
| 2016 | 15,610.66 | 15,746.29 | -135.63 |
| 2017 | 15,975.57 | 16,126.82 | -151.24 |
| 2018 | 16,387.30 | 16,547.80 | -160.50 |
| 2019 | 16,834.51 | 17,003.41 | -168.90 |
| 2020 | 17,314.42 | 17,491.98 | -177.56 |
| 2021 | 17,788.46 | 17,967.85 | -179.38 |
| 2022 | 18,260.97 | 18,438.40 | -177.43 |
| 2023 | 18,732.80 | 18,910.34 | -177.54 |
| 2024 | 19,202.42 | 19,383.48 | -181.06 |
| 2025 | 19,702.62 | 19,895.86 | -193.23 |
| 2026 | 20,199.37 | 20,409.99 | -210.61 |
| 2027 | 20,685.56 | 20,912.75 | -227.19 |
| 2028 | 21,179.29 | 21,422.41 | -243.12 |
| 2029 | 21,675.07 | 21,932.93 | -257.86 |
| 2030 | 22,208.55 | 22,479.82 | -271.27 |
| 2031 | 22,755.20 | 23,038.46 | -283.26 |
| 2032 | 23,300.11 | 23,589.66 | -289.55 |
| 2033 | 23,869.47 | 24,161.71 | -292.24 |
| 2034 | 24,475.40 | 24,768.59 | -293.19 |
| 2035 | 25,098.95 | 25,393.54 | -294.59 |

Real GDP Growth Rate

Percent Change from Year Before

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 3.39 | 3.57 | -0.18 |
| 2013 | 3.23 | 3.41 | -0.19 |
| 2014 | 2.57 | 2.73 | -0.16 |
| 2015 | 2.31 | 2.43 | -0.12 |
| 2016 | 2.28 | 2.37 | -0.09 |
| 2017 | 2.34 | 2.42 | -0.08 |
| 2018 | 2.58 | 2.61 | -0.03 |
| 2019 | 2.73 | 2.75 | -0.02 |
| 2020 | 2.85 | 2.87 | -0.02 |
| 2021 | 2.74 | 2.72 | 0.02 |
| 2022 | 2.66 | 2.62 | 0.04 |
| 2023 | 2.58 | 2.56 | 0.02 |
| 2024 | 2.51 | 2.50 | 0.00 |
| 2025 | 2.60 | 2.64 | -0.04 |
| 2026 | 2.52 | 2.58 | -0.06 |
| 2027 | 2.41 | 2.46 | -0.06 |
| 2028 | 2.39 | 2.44 | -0.05 |
| 2029 | 2.34 | 2.38 | -0.04 |
| 2030 | 2.46 | 2.49 | -0.03 |
| 2031 | 2.46 | 2.49 | -0.02 |
| 2032 | 2.39 | 2.39 | 0.00 |
| 2033 | 2.44 | 2.43 | 0.02 |
| 2034 | 2.54 | 2.51 | 0.03 |
| 2035 | 2.55 | 2.52 | 0.02 |

Total Employment

In Thousands of Jobs

| | Forecast | Baseline | +/- |
|------|------------|------------|-----------|
| 2012 | 134,364.58 | 134,694.63 | -330.04 |
| 2013 | 137,631.52 | 138,169.00 | -537.48 |
| 2014 | 139,820.13 | 140,551.53 | -731.39 |
| 2015 | 141,177.94 | 142,051.50 | -873.56 |
| 2016 | 142,228.15 | 143,201.03 | -972.87 |
| 2017 | 143,253.60 | 144,312.60 | -1,059.00 |
| 2018 | 144,424.89 | 145,526.68 | -1,101.79 |
| 2019 | 145,735.39 | 146,858.30 | -1,122.91 |
| 2020 | 147,127.63 | 148,267.20 | -1,139.57 |
| 2021 | 148,441.49 | 149,548.98 | -1,107.48 |
| 2022 | 149,877.05 | 150,918.22 | -1,041.18 |
| 2023 | 151,317.34 | 152,298.47 | -981.13 |
| 2024 | 152,723.19 | 153,667.73 | -944.53 |
| 2025 | 154,140.42 | 155,103.80 | -963.38 |
| 2026 | 155,537.02 | 156,565.83 | -1,028.80 |
| 2027 | 156,926.16 | 158,021.95 | -1,095.79 |
| 2028 | 158,324.93 | 159,481.53 | -1,156.59 |
| 2029 | 159,778.38 | 160,982.98 | -1,204.60 |
| 2030 | 161,314.36 | 162,554.08 | -1,239.71 |
| 2031 | 162,628.83 | 163,899.10 | -1,270.27 |
| 2032 | 163,990.53 | 165,265.45 | -1,274.92 |
| 2033 | 165,343.14 | 166,595.35 | -1,252.21 |
| 2034 | 166,763.46 | 167,975.10 | -1,211.64 |
| 2035 | 168,239.18 | 169,406.35 | -1,167.17 |

Private Employment

In Thousands of Jobs

| | Forecast | Baseline | +/- |
|------|------------|------------|-----------|
| 2012 | 112,143.81 | 112,442.88 | -299.07 |
| 2013 | 115,041.31 | 115,537.15 | -495.84 |
| 2014 | 116,898.87 | 117,578.05 | -679.19 |
| 2015 | 118,064.60 | 118,882.63 | -818.02 |
| 2016 | 119,013.46 | 119,933.56 | -920.11 |
| 2017 | 119,941.39 | 120,952.56 | -1,011.17 |
| 2018 | 120,981.06 | 122,044.00 | -1,062.94 |
| 2019 | 122,140.67 | 123,237.39 | -1,096.72 |
| 2020 | 123,299.85 | 124,426.29 | -1,126.45 |
| 2021 | 124,581.07 | 125,693.60 | -1,112.53 |
| 2022 | 125,849.57 | 126,918.19 | -1,068.62 |
| 2023 | 127,132.86 | 128,163.11 | -1,030.25 |
| 2024 | 128,396.15 | 129,407.88 | -1,011.73 |
| 2025 | 129,675.43 | 130,716.45 | -1,041.02 |
| 2026 | 130,933.90 | 132,042.27 | -1,108.37 |
| 2027 | 132,194.77 | 133,370.23 | -1,175.46 |
| 2028 | 133,474.81 | 134,711.49 | -1,236.68 |
| 2029 | 134,813.48 | 136,099.98 | -1,286.50 |
| 2030 | 136,150.30 | 137,474.75 | -1,324.45 |
| 2031 | 137,457.03 | 138,815.91 | -1,358.88 |
| 2032 | 138,717.48 | 140,086.98 | -1,369.50 |
| 2033 | 139,967.67 | 141,323.85 | -1,356.19 |
| 2034 | 141,280.29 | 142,606.26 | -1,325.97 |
| 2035 | 142,652.23 | 143,943.59 | -1,291.35 |

Unemployment Rate

Percent of Civilian Labor Force

| | Forecast | Baseline | +/- |
|------|----------|----------|------|
| 2012 | 8.68 | 8.59 | 0.09 |
| 2013 | 7.75 | 7.62 | 0.13 |
| 2014 | 7.25 | 7.08 | 0.17 |
| 2015 | 7.03 | 6.84 | 0.19 |
| 2016 | 6.83 | 6.64 | 0.20 |
| 2017 | 6.61 | 6.41 | 0.20 |
| 2018 | 6.30 | 6.11 | 0.19 |
| 2019 | 5.91 | 5.75 | 0.17 |
| 2020 | 5.46 | 5.31 | 0.14 |
| 2021 | 5.15 | 5.04 | 0.12 |
| 2022 | 5.02 | 4.94 | 0.08 |
| 2023 | 4.92 | 4.87 | 0.05 |
| 2024 | 4.87 | 4.84 | 0.03 |
| 2025 | 4.88 | 4.84 | 0.03 |
| 2026 | 4.91 | 4.86 | 0.05 |
| 2027 | 4.93 | 4.86 | 0.07 |
| 2028 | 4.96 | 4.88 | 0.09 |
| 2029 | 5.01 | 4.91 | 0.10 |
| 2030 | 5.06 | 4.95 | 0.11 |
| 2031 | 5.10 | 4.99 | 0.11 |
| 2032 | 5.13 | 5.02 | 0.11 |
| 2033 | 5.15 | 5.06 | 0.09 |
| 2034 | 5.17 | 5.09 | 0.08 |
| 2035 | 5.18 | 5.12 | 0.06 |

Disposable Personal Income

In Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|---------|
| 2012 | 10,568.93 | 10,595.06 | -26.13 |
| 2013 | 10,792.58 | 10,835.41 | -42.84 |
| 2014 | 11,120.32 | 11,181.33 | -61.00 |
| 2015 | 11,476.27 | 11,555.25 | -78.99 |
| 2016 | 11,781.65 | 11,877.49 | -95.84 |
| 2017 | 12,096.60 | 12,209.28 | -112.69 |
| 2018 | 12,435.10 | 12,560.71 | -125.61 |
| 2019 | 12,819.88 | 12,955.88 | -136.00 |
| 2020 | 13,243.93 | 13,390.12 | -146.19 |
| 2021 | 13,657.50 | 13,810.45 | -152.95 |
| 2022 | 14,034.99 | 14,192.00 | -157.01 |
| 2023 | 14,381.92 | 14,543.02 | -161.10 |
| 2024 | 14,703.83 | 14,870.34 | -166.51 |
| 2025 | 15,071.86 | 15,247.73 | -175.87 |
| 2026 | 15,424.10 | 15,612.38 | -188.29 |
| 2027 | 15,799.59 | 16,001.25 | -201.66 |
| 2028 | 16,183.54 | 16,398.98 | -215.44 |
| 2029 | 16,544.16 | 16,772.78 | -228.61 |
| 2030 | 16,924.29 | 17,165.83 | -241.53 |
| 2031 | 17,320.51 | 17,574.87 | -254.36 |
| 2032 | 17,717.74 | 17,981.96 | -264.22 |
| 2033 | 18,101.82 | 18,372.74 | -270.92 |
| 2034 | 18,526.40 | 18,802.86 | -276.46 |
| 2035 | 18,969.47 | 19,250.37 | -280.90 |

The Effect of Renewable Energy Standards: Key Indicators (cont.)

Disposable Income per Capita

In Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- (Person) | +/- (Family of 4) |
|------|-----------|-----------|--------------|-------------------|
| 2012 | 33,431.19 | 33,513.84 | -82.65 | -330.58 |
| 2013 | 33,811.21 | 33,945.41 | -134.20 | -536.81 |
| 2014 | 34,504.06 | 34,693.33 | -189.27 | -757.09 |
| 2015 | 35,267.73 | 35,510.47 | -242.74 | -970.95 |
| 2016 | 35,860.70 | 36,152.41 | -291.70 | -1,166.82 |
| 2017 | 36,469.25 | 36,808.98 | -339.73 | -1,358.93 |
| 2018 | 37,134.89 | 37,510.02 | -375.12 | -1,500.49 |
| 2019 | 37,923.44 | 38,325.75 | -402.32 | -1,609.28 |
| 2020 | 38,811.04 | 39,239.44 | -428.40 | -1,713.62 |
| 2021 | 39,650.95 | 40,094.99 | -444.04 | -1,776.18 |
| 2022 | 40,371.16 | 40,822.78 | -451.63 | -1,806.50 |
| 2023 | 40,990.58 | 41,449.74 | -459.16 | -1,836.65 |
| 2024 | 41,527.92 | 41,998.20 | -470.28 | -1,881.11 |
| 2025 | 42,184.70 | 42,676.94 | -492.24 | -1,968.95 |
| 2026 | 42,786.07 | 43,308.38 | -522.30 | -2,089.21 |
| 2027 | 43,441.09 | 43,995.55 | -554.46 | -2,217.84 |
| 2028 | 44,107.93 | 44,695.10 | -587.17 | -2,348.67 |
| 2029 | 44,700.54 | 45,318.23 | -617.69 | -2,470.77 |
| 2030 | 45,335.49 | 45,982.49 | -647.00 | -2,588.01 |
| 2031 | 46,002.49 | 46,678.05 | -675.57 | -2,702.26 |
| 2032 | 46,661.01 | 47,356.87 | -695.85 | -2,783.42 |
| 2033 | 47,274.23 | 47,981.76 | -707.53 | -2,830.13 |
| 2034 | 47,981.95 | 48,697.95 | -716.00 | -2,864.00 |
| 2035 | 48,725.20 | 49,446.72 | -721.52 | -2,886.08 |

Personal Consumption

Expenditures in Billions of
Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|---------|
| 2012 | 9,892.71 | 9,916.07 | -23.36 |
| 2013 | 10,109.29 | 10,145.73 | -36.44 |
| 2014 | 10,322.04 | 10,371.54 | -49.49 |
| 2015 | 10,588.82 | 10,650.33 | -61.51 |
| 2016 | 10,833.24 | 10,904.56 | -71.31 |
| 2017 | 11,051.27 | 11,131.66 | -80.39 |
| 2018 | 11,293.30 | 11,380.50 | -87.20 |
| 2019 | 11,567.18 | 11,659.11 | -91.93 |
| 2020 | 11,884.78 | 11,981.23 | -96.45 |
| 2021 | 12,221.83 | 12,322.39 | -100.56 |
| 2022 | 12,541.71 | 12,644.61 | -102.89 |
| 2023 | 12,854.56 | 12,960.79 | -106.23 |
| 2024 | 13,153.43 | 13,265.96 | -112.53 |
| 2025 | 13,461.97 | 13,586.27 | -124.30 |
| 2026 | 13,771.91 | 13,912.29 | -140.39 |
| 2027 | 14,087.26 | 14,245.88 | -158.62 |
| 2028 | 14,416.16 | 14,593.39 | -177.23 |
| 2029 | 14,742.86 | 14,938.34 | -195.49 |
| 2030 | 15,083.78 | 15,296.79 | -213.01 |
| 2031 | 15,445.59 | 15,673.32 | -227.73 |
| 2032 | 15,814.71 | 16,051.41 | -236.69 |
| 2033 | 16,189.74 | 16,432.25 | -242.51 |
| 2034 | 16,584.38 | 16,831.32 | -246.94 |
| 2035 | 16,989.11 | 17,240.93 | -251.82 |

Personal Savings

In Billions of
Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|----------|----------|--------|
| 2012 | 335.19 | 336.68 | -1.49 |
| 2013 | 320.87 | 325.19 | -4.32 |
| 2014 | 414.27 | 422.83 | -8.56 |
| 2015 | 479.93 | 493.69 | -13.76 |
| 2016 | 518.24 | 538.60 | -20.36 |
| 2017 | 597.05 | 624.81 | -27.76 |
| 2018 | 678.91 | 712.53 | -33.62 |
| 2019 | 774.52 | 813.78 | -39.26 |
| 2020 | 864.81 | 909.77 | -44.96 |
| 2021 | 924.27 | 972.16 | -47.89 |
| 2022 | 966.71 | 1,016.84 | -50.13 |
| 2023 | 987.15 | 1,038.58 | -51.44 |
| 2024 | 999.52 | 1,050.43 | -50.91 |
| 2025 | 1,049.27 | 1,097.84 | -48.57 |
| 2026 | 1,082.24 | 1,126.87 | -44.63 |
| 2027 | 1,132.71 | 1,172.02 | -39.31 |
| 2028 | 1,177.56 | 1,211.49 | -33.93 |
| 2029 | 1,201.49 | 1,229.81 | -28.32 |
| 2030 | 1,230.93 | 1,254.21 | -23.28 |
| 2031 | 1,254.41 | 1,275.47 | -21.06 |
| 2032 | 1,270.80 | 1,292.70 | -21.90 |
| 2033 | 1,268.01 | 1,291.04 | -23.02 |
| 2034 | 1,285.64 | 1,310.17 | -24.53 |
| 2035 | 1,311.30 | 1,335.89 | -24.59 |

Personal Savings Rate

Percent of Disposable Personal Income

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 3.17 | 3.17 | -0.01 |
| 2013 | 2.97 | 3.00 | -0.03 |
| 2014 | 3.72 | 3.78 | -0.06 |
| 2015 | 4.18 | 4.27 | -0.09 |
| 2016 | 4.39 | 4.53 | -0.14 |
| 2017 | 4.92 | 5.11 | -0.19 |
| 2018 | 5.44 | 5.65 | -0.22 |
| 2019 | 6.01 | 6.26 | -0.25 |
| 2020 | 6.50 | 6.77 | -0.27 |
| 2021 | 6.74 | 7.01 | -0.28 |
| 2022 | 6.86 | 7.14 | -0.28 |
| 2023 | 6.83 | 7.11 | -0.28 |
| 2024 | 6.75 | 7.02 | -0.27 |
| 2025 | 6.91 | 7.15 | -0.24 |
| 2026 | 6.95 | 7.15 | -0.20 |
| 2027 | 7.09 | 7.25 | -0.16 |
| 2028 | 7.19 | 7.30 | -0.11 |
| 2029 | 7.17 | 7.24 | -0.07 |
| 2030 | 7.17 | 7.20 | -0.03 |
| 2031 | 7.13 | 7.14 | -0.02 |
| 2032 | 7.05 | 7.06 | -0.02 |
| 2033 | 6.87 | 6.89 | -0.02 |
| 2034 | 6.79 | 6.82 | -0.03 |
| 2035 | 6.76 | 6.79 | -0.03 |

Private Domestic Investment

Gross, in Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|----------|----------|--------|
| 2012 | 2,153.34 | 2,165.74 | -12.40 |
| 2013 | 2,380.96 | 2,401.28 | -20.33 |
| 2014 | 2,486.02 | 2,512.31 | -26.29 |
| 2015 | 2,528.40 | 2,558.74 | -30.34 |
| 2016 | 2,598.61 | 2,630.08 | -31.47 |
| 2017 | 2,671.67 | 2,705.31 | -33.64 |
| 2018 | 2,761.19 | 2,795.36 | -34.17 |
| 2019 | 2,865.32 | 2,897.98 | -32.66 |
| 2020 | 2,969.56 | 3,005.15 | -35.59 |
| 2021 | 3,056.00 | 3,090.77 | -34.77 |
| 2022 | 3,139.42 | 3,171.01 | -31.59 |
| 2023 | 3,229.51 | 3,259.97 | -30.46 |
| 2024 | 3,311.98 | 3,343.28 | -31.30 |
| 2025 | 3,414.21 | 3,448.62 | -34.40 |
| 2026 | 3,523.20 | 3,564.12 | -40.92 |
| 2027 | 3,622.07 | 3,666.70 | -44.63 |
| 2028 | 3,720.36 | 3,767.39 | -47.03 |
| 2029 | 3,820.31 | 3,869.21 | -48.90 |
| 2030 | 3,942.88 | 3,992.44 | -49.56 |
| 2031 | 4,076.91 | 4,126.88 | -49.97 |
| 2032 | 4,196.50 | 4,245.52 | -49.02 |
| 2033 | 4,327.63 | 4,374.42 | -46.79 |
| 2034 | 4,481.89 | 4,527.06 | -45.17 |
| 2035 | 4,646.08 | 4,690.04 | -43.96 |

Non-Residential Investment

Fixed, in Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|----------|----------|--------|
| 2012 | 1,534.60 | 1,543.09 | -8.49 |
| 2013 | 1,710.88 | 1,725.41 | -14.54 |
| 2014 | 1,819.65 | 1,839.12 | -19.48 |
| 2015 | 1,875.02 | 1,898.22 | -23.20 |
| 2016 | 1,916.16 | 1,941.56 | -25.39 |
| 2017 | 1,980.56 | 2,008.40 | -27.83 |
| 2018 | 2,061.72 | 2,090.74 | -29.02 |
| 2019 | 2,154.40 | 2,183.85 | -29.45 |
| 2020 | 2,246.62 | 2,278.48 | -31.86 |
| 2021 | 2,334.28 | 2,366.34 | -32.05 |
| 2022 | 2,422.47 | 2,452.90 | -30.43 |
| 2023 | 2,511.96 | 2,541.68 | -29.73 |
| 2024 | 2,601.62 | 2,631.87 | -30.25 |
| 2025 | 2,698.89 | 2,731.53 | -32.64 |
| 2026 | 2,803.00 | 2,840.12 | -37.12 |
| 2027 | 2,910.96 | 2,950.85 | -39.89 |
| 2028 | 3,024.16 | 3,065.67 | -41.52 |
| 2029 | 3,140.71 | 3,183.48 | -42.77 |
| 2030 | 3,265.35 | 3,308.73 | -43.38 |
| 2031 | 3,398.76 | 3,442.84 | -44.08 |
| 2032 | 3,531.92 | 3,575.63 | -43.71 |
| 2033 | 3,675.86 | 3,718.37 | -42.51 |
| 2034 | 3,829.36 | 3,870.96 | -41.60 |
| 2035 | 3,993.88 | 4,034.76 | -40.89 |

The Effect of Renewable Energy Standards: Key Indicators (cont.)

Residential Investment

Fixed, in Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 562.77 | 564.74 | -1.97 |
| 2013 | 611.93 | 615.77 | -3.84 |
| 2014 | 632.50 | 637.46 | -4.96 |
| 2015 | 630.79 | 636.17 | -5.38 |
| 2016 | 645.26 | 650.45 | -5.19 |
| 2017 | 649.59 | 654.52 | -4.93 |
| 2018 | 656.59 | 661.06 | -4.46 |
| 2019 | 666.78 | 670.48 | -3.70 |
| 2020 | 680.42 | 683.70 | -3.28 |
| 2021 | 682.69 | 685.35 | -2.67 |
| 2022 | 683.85 | 685.66 | -1.80 |
| 2023 | 686.75 | 687.74 | -1.00 |
| 2024 | 685.56 | 686.22 | -0.66 |
| 2025 | 692.39 | 693.30 | -0.90 |
| 2026 | 699.94 | 701.73 | -1.79 |
| 2027 | 698.64 | 701.34 | -2.70 |
| 2028 | 691.07 | 694.49 | -3.42 |
| 2029 | 683.56 | 687.40 | -3.85 |
| 2030 | 686.14 | 690.18 | -4.04 |
| 2031 | 691.71 | 695.83 | -4.12 |
| 2032 | 689.34 | 693.27 | -3.94 |
| 2033 | 687.53 | 690.86 | -3.33 |
| 2034 | 694.98 | 697.56 | -2.58 |
| 2035 | 704.31 | 706.31 | -2.00 |

Change in Business Inventories

Stock, in Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 60.90 | 62.73 | -1.84 |
| 2013 | 63.82 | 65.68 | -1.86 |
| 2014 | 41.40 | 43.15 | -1.75 |
| 2015 | 31.23 | 32.90 | -1.67 |
| 2016 | 45.49 | 46.39 | -0.90 |
| 2017 | 50.72 | 51.66 | -0.94 |
| 2018 | 53.58 | 54.36 | -0.78 |
| 2019 | 56.65 | 56.31 | 0.34 |
| 2020 | 56.85 | 57.51 | -0.66 |
| 2021 | 56.34 | 56.60 | -0.26 |
| 2022 | 53.86 | 53.37 | 0.49 |
| 2023 | 55.19 | 55.09 | 0.10 |
| 2024 | 53.71 | 54.25 | -0.54 |
| 2025 | 55.90 | 56.94 | -1.04 |
| 2026 | 57.87 | 60.09 | -2.22 |
| 2027 | 56.96 | 59.08 | -2.12 |
| 2028 | 58.66 | 60.67 | -2.01 |
| 2029 | 59.40 | 61.45 | -2.05 |
| 2030 | 63.33 | 65.12 | -1.79 |
| 2031 | 67.34 | 68.66 | -1.32 |
| 2032 | 67.77 | 68.49 | -0.73 |
| 2033 | 69.66 | 69.86 | -0.20 |
| 2034 | 74.36 | 74.62 | -0.25 |
| 2035 | 76.87 | 77.14 | -0.27 |

Full-Employment Stock

Capital Stock, in Billions of Inflation-Adjusted Dollars
(Indexed to the 2005 Price Level)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|-----------|
| 2012 | 14,938.15 | 14,950.93 | -12.79 |
| 2013 | 15,368.06 | 15,401.47 | -33.41 |
| 2014 | 15,863.11 | 15,924.60 | -61.50 |
| 2015 | 16,353.39 | 16,448.12 | -94.74 |
| 2016 | 16,815.35 | 16,947.26 | -131.91 |
| 2017 | 17,279.80 | 17,452.21 | -172.41 |
| 2018 | 17,766.02 | 17,981.63 | -215.61 |
| 2019 | 18,286.30 | 18,545.39 | -259.09 |
| 2020 | 18,836.86 | 19,142.09 | -305.23 |
| 2021 | 19,407.80 | 19,760.56 | -352.77 |
| 2022 | 19,990.99 | 20,388.11 | -397.12 |
| 2023 | 20,585.96 | 21,024.66 | -438.70 |
| 2024 | 21,191.13 | 21,670.55 | -479.42 |
| 2025 | 21,811.84 | 22,333.27 | -521.43 |
| 2026 | 22,455.15 | 23,023.35 | -568.20 |
| 2027 | 23,120.99 | 23,739.98 | -618.99 |
| 2028 | 23,808.27 | 24,479.28 | -671.02 |
| 2029 | 24,516.75 | 25,240.81 | -724.06 |
| 2030 | 25,249.96 | 26,027.53 | -777.57 |
| 2031 | 26,011.03 | 26,842.43 | -831.40 |
| 2032 | 26,799.61 | 27,685.00 | -885.40 |
| 2033 | 27,616.97 | 28,555.93 | -938.96 |
| 2034 | 28,465.71 | 29,458.38 | -992.67 |
| 2035 | 29,350.65 | 30,396.95 | -1,046.31 |

Consumer Price Index

Percent Change from Year Before

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 2.10 | 2.03 | 0.07 |
| 2013 | 1.96 | 1.90 | 0.06 |
| 2014 | 1.94 | 1.90 | 0.03 |
| 2015 | 2.01 | 1.99 | 0.02 |
| 2016 | 1.98 | 1.99 | 0.00 |
| 2017 | 1.94 | 1.96 | -0.02 |
| 2018 | 1.91 | 1.95 | -0.04 |
| 2019 | 1.81 | 1.86 | -0.05 |
| 2020 | 1.66 | 1.72 | -0.06 |
| 2021 | 1.56 | 1.61 | -0.05 |
| 2022 | 1.58 | 1.62 | -0.04 |
| 2023 | 1.63 | 1.65 | -0.02 |
| 2024 | 1.75 | 1.75 | 0.00 |
| 2025 | 1.84 | 1.82 | 0.01 |
| 2026 | 1.88 | 1.85 | 0.03 |
| 2027 | 1.92 | 1.89 | 0.04 |
| 2028 | 1.97 | 1.93 | 0.04 |
| 2029 | 1.99 | 1.95 | 0.04 |
| 2030 | 1.98 | 1.94 | 0.04 |
| 2031 | 1.97 | 1.94 | 0.03 |
| 2032 | 1.95 | 1.93 | 0.02 |
| 2033 | 1.93 | 1.92 | 0.01 |
| 2034 | 1.94 | 1.93 | 0.01 |
| 2035 | 1.95 | 1.94 | 0.01 |

Treasury Bill, 3-Month

Annualized Percent

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 3.18 | 3.23 | -0.04 |
| 2013 | 3.43 | 3.48 | -0.05 |
| 2014 | 4.34 | 4.41 | -0.07 |
| 2015 | 4.50 | 4.60 | -0.10 |
| 2016 | 4.46 | 4.60 | -0.14 |
| 2017 | 4.43 | 4.60 | -0.17 |
| 2018 | 4.39 | 4.60 | -0.21 |
| 2019 | 4.36 | 4.60 | -0.24 |
| 2020 | 4.34 | 4.60 | -0.26 |
| 2021 | 4.32 | 4.60 | -0.28 |
| 2022 | 4.31 | 4.60 | -0.29 |
| 2023 | 4.29 | 4.60 | -0.31 |
| 2024 | 4.29 | 4.60 | -0.31 |
| 2025 | 4.28 | 4.60 | -0.32 |
| 2026 | 4.27 | 4.60 | -0.33 |
| 2027 | 4.26 | 4.60 | -0.34 |
| 2028 | 4.25 | 4.60 | -0.35 |
| 2029 | 4.24 | 4.60 | -0.36 |
| 2030 | 4.23 | 4.60 | -0.37 |
| 2031 | 4.22 | 4.60 | -0.38 |
| 2032 | 4.22 | 4.60 | -0.38 |
| 2033 | 4.21 | 4.60 | -0.39 |
| 2034 | 4.21 | 4.60 | -0.39 |
| 2035 | 4.20 | 4.60 | -0.40 |

Treasury Bond, 10-Year

Annualized Percent

| | Forecast | Baseline | +/- |
|------|----------|----------|-------|
| 2012 | 4.45 | 4.46 | -0.01 |
| 2013 | 4.61 | 4.60 | 0.01 |
| 2014 | 5.42 | 5.41 | 0.01 |
| 2015 | 5.57 | 5.57 | 0.00 |
| 2016 | 5.55 | 5.57 | -0.02 |
| 2017 | 5.53 | 5.57 | -0.04 |
| 2018 | 5.51 | 5.57 | -0.06 |
| 2019 | 5.50 | 5.57 | -0.07 |
| 2020 | 5.48 | 5.57 | -0.09 |
| 2021 | 5.48 | 5.57 | -0.09 |
| 2022 | 5.47 | 5.57 | -0.10 |
| 2023 | 5.47 | 5.57 | -0.10 |
| 2024 | 5.47 | 5.57 | -0.10 |
| 2025 | 5.47 | 5.57 | -0.10 |
| 2026 | 5.47 | 5.57 | -0.10 |
| 2027 | 5.48 | 5.57 | -0.09 |
| 2028 | 5.48 | 5.57 | -0.09 |
| 2029 | 5.48 | 5.57 | -0.09 |
| 2030 | 5.48 | 5.57 | -0.09 |
| 2031 | 5.48 | 5.57 | -0.09 |
| 2032 | 5.47 | 5.57 | -0.10 |
| 2033 | 5.47 | 5.57 | -0.10 |
| 2034 | 5.47 | 5.57 | -0.10 |
| 2035 | 5.47 | 5.57 | -0.10 |

The Effect of Renewable Energy Standards: Key Indicators (cont.)

Unified Federal Tax Revenue

In Billions of Dollars
(Not Adjusted for Inflation)

| | Forecast | Baseline | +/- |
|------|----------|----------|---------|
| 2012 | 2,708.73 | 2,724.98 | -16.25 |
| 2013 | 3,017.03 | 3,042.57 | -25.54 |
| 2014 | 3,181.70 | 3,214.66 | -32.97 |
| 2015 | 3,306.89 | 3,344.39 | -37.50 |
| 2016 | 3,449.95 | 3,490.74 | -40.79 |
| 2017 | 3,598.91 | 3,644.17 | -45.26 |
| 2018 | 3,788.67 | 3,839.14 | -50.47 |
| 2019 | 3,991.86 | 4,048.93 | -57.07 |
| 2020 | 4,232.32 | 4,296.71 | -64.40 |
| 2021 | 4,501.21 | 4,568.88 | -67.68 |
| 2022 | 4,795.23 | 4,863.51 | -68.28 |
| 2023 | 5,100.03 | 5,170.76 | -70.73 |
| 2024 | 5,408.10 | 5,484.19 | -76.10 |
| 2025 | 5,692.83 | 5,778.13 | -85.30 |
| 2026 | 6,019.43 | 6,117.08 | -97.65 |
| 2027 | 6,335.48 | 6,443.02 | -107.54 |
| 2028 | 6,661.02 | 6,777.08 | -116.07 |
| 2029 | 7,044.70 | 7,169.15 | -124.45 |
| 2030 | 7,445.42 | 7,577.47 | -132.04 |
| 2031 | 7,819.98 | 7,959.57 | -139.58 |
| 2032 | 8,215.10 | 8,361.39 | -146.29 |
| 2033 | 8,664.52 | 8,818.02 | -153.50 |
| 2034 | 9,106.50 | 9,266.63 | -160.13 |
| 2035 | 9,576.81 | 9,744.41 | -167.60 |

Unified Federal Spending

In Billions of Dollars
(Not Adjusted for Inflation)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|--------|
| 2012 | 3,598.50 | 3,598.30 | 0.20 |
| 2013 | 3,700.86 | 3,698.11 | 2.75 |
| 2014 | 3,868.43 | 3,862.90 | 5.53 |
| 2015 | 4,072.11 | 4,064.74 | 7.37 |
| 2016 | 4,238.90 | 4,231.41 | 7.50 |
| 2017 | 4,442.80 | 4,436.86 | 5.94 |
| 2018 | 4,700.82 | 4,697.81 | 3.00 |
| 2019 | 4,994.96 | 4,996.15 | -1.20 |
| 2020 | 5,299.74 | 5,305.55 | -5.82 |
| 2021 | 5,610.38 | 5,620.52 | -10.15 |
| 2022 | 5,933.14 | 5,947.63 | -14.49 |
| 2023 | 6,260.92 | 6,279.98 | -19.06 |
| 2024 | 6,576.99 | 6,599.88 | -22.89 |
| 2025 | 6,909.94 | 6,935.50 | -25.56 |
| 2026 | 7,260.14 | 7,286.83 | -26.69 |
| 2027 | 7,625.94 | 7,652.07 | -26.13 |
| 2028 | 8,010.33 | 8,034.86 | -24.53 |
| 2029 | 8,413.53 | 8,435.87 | -22.34 |
| 2030 | 8,838.67 | 8,858.56 | -19.89 |
| 2031 | 9,257.29 | 9,274.87 | -17.58 |
| 2032 | 9,695.42 | 9,711.35 | -15.93 |
| 2033 | 10,147.10 | 10,161.90 | -14.80 |
| 2034 | 10,616.96 | 10,630.55 | -13.59 |
| 2035 | 11,112.83 | 11,124.18 | -11.35 |

Unified Federal Surplus/Deficit

In Billions of Dollars
(Not Adjusted for Inflation)

| | Forecast | Baseline | +/- |
|------|-----------|-----------|---------|
| 2012 | -889.77 | -873.32 | -16.45 |
| 2013 | -683.82 | -655.53 | -28.29 |
| 2014 | -686.73 | -648.24 | -38.49 |
| 2015 | -765.22 | -720.35 | -44.87 |
| 2016 | -788.95 | -740.67 | -48.29 |
| 2017 | -843.89 | -792.69 | -51.21 |
| 2018 | -912.15 | -858.68 | -53.48 |
| 2019 | -1,003.09 | -947.22 | -55.87 |
| 2020 | -1,067.42 | -1,008.84 | -58.58 |
| 2021 | -1,109.17 | -1,051.64 | -57.53 |
| 2022 | -1,137.91 | -1,084.12 | -53.79 |
| 2023 | -1,160.89 | -1,109.22 | -51.67 |
| 2024 | -1,168.89 | -1,115.69 | -53.20 |
| 2025 | -1,217.11 | -1,157.37 | -59.74 |
| 2026 | -1,240.71 | -1,169.75 | -70.97 |
| 2027 | -1,290.46 | -1,209.05 | -81.41 |
| 2028 | -1,349.31 | -1,257.78 | -91.53 |
| 2029 | -1,368.83 | -1,266.72 | -102.11 |
| 2030 | -1,393.25 | -1,281.10 | -112.15 |
| 2031 | -1,437.31 | -1,315.30 | -122.01 |
| 2032 | -1,480.32 | -1,349.96 | -130.36 |
| 2033 | -1,482.59 | -1,343.89 | -138.70 |
| 2034 | -1,510.46 | -1,363.92 | -146.54 |
| 2035 | -1,536.02 | -1,379.77 | -156.25 |

Source: Heritage Foundation calculations using data from the IHS-Global Insight U.S. macroeconomic model.

Appendix Table I • CDA 10-03  heritage.org

Can you please help us with the destruction of our community, and our family and neighbors. It is not because of the unknown, it is because of what we do know and what we have learned from other communities, and other countries who have these industrial turbines, that we know we do not want them here.

Just remember the answer is not blowing in the wind.

Ronald Eichhorst

Connie Eichhorst

Connie
Eichhorst

Personally came before me on
this 28th day of
February 2011

Ken Jenks
Ken Jenks

Notary Public, Wisconsin
Commission Expires: 09/28/2014

I am writing my comment in the concern about the industrial wind turbines, that they want to put up in our small townships of Holland, Morrison, Wrightstown and Glenmore. I am concerned about the the safety and health of my family and friends that live in this small community. I have learned that there are a lot of medical effects that come from the wind turbines, such as low frequency noise, decreased memory, concentration, upper respiratory illnesses, and fatigue are tributed to people who live with in one to half a mile away from these turbines. Also there is evidence of both endocrine and cardiovascular problems with cattle who live and graze near the turbines. The effects include aggressive and erratic behavior, increase of mastites , lower birth rates and still births. There is also flickering, shadows that come into your windows of your home from these huge 472 feet turbines.

Now you tell me do you really think it is safe for our community to be living 1000 to 1300 ft. from these monsters.

Thank You, Connie Eichhorst

Connie Eichhorst

Dear Joint Committee of Review,

I am writing to you to express my very sincere feelings on the setting rules concerning wind turbines.

I feel that alternative energy is important, but first we must consider the health and safety of the citizens of our great state of Wisconsin. This is a very important issue. I feel that a setback of 1800 feet from the property lines of a non participating home is adequate. The noise and shadow flicker from the turbines themselves have caused health problems. There have been extensive studies done to prove this issue.

Again, please consider the safety of the citizens of Wisconsin.

Thank you for your consideration




Karla Wiederholt

2185 Hill Road

Cuba City, WI 53807

608-744-2598

Notary: 
Jennifer M. Marshall
State of Wisconsin
Exp: 2-3-13

JERILYN J. FLETCHER
6215 County Rd. W, Greenleaf, WI 54126
920-864-7262
email: jerilynletcher@centurytel.net

February 9, 2011

To: Joint Committee for Review of Administrative Rules
State of Wisconsin


Re: PUBLIC HEARING – February 9, 2011
PSC 128 (CR 10-057)
Relating to the siting of wind energy systems

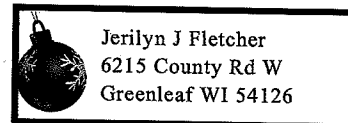
Committee Members:

I live in the Town of Glenmore (Wi), where the Shirley Wind Project was currently constructed. There are 6 turbines put up very close to my home with more proposed. I am a widowed senior citizen and have lived in my present home located in what use to be beautiful rural Wisconsin for 26+ years.

I DO NOT WANT TO DIE SURROUNDED BY WIND TURBINES AS A SCIENCE EXPERIMENT FOR CORPORATE GREED!!!!!! YOU MUST STOP THIS MADNESS NOW! NO MORE WIND TURBINES IN OUR BEAUTIFUL STATE OF WISCONSIN!!!!

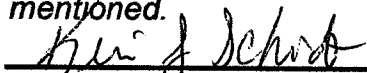
Sincerely,


Jerilyn J. Fletcher



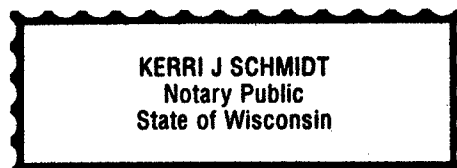
State of Wisconsin
County of Brown

On this day February 7, 2011, personally appeared before me,
Jerilyn Fletcher, to me known to be the person described
in and who executed the within and foregoing instrument, and acknowledged that he/she
signed the same as his/her voluntary act and deed, for the uses and purposes therein
mentioned.


Notary's Signature

10/20/13
Notary's Expiration Date

Notary's Seal



DEAR CO-CHAIRS & MEMBERS,

THANK YOU FOR COMING TOGETHER TO HAVE A PUBLIC HEARING ON THE RULES FROM THE PSC ABOUT THE WIND TURBINES.

THERE ARE A LOT OF CONCERNED CITIZENS IN WISCONSIN WHO WANT TO HAVE MORE OF A SET BACK FOR THE TURBINES TO PROTECT OUR CITIZENS HEALTH. THE HEALTH OF PEOPLE SHOULD BE THE FIRST CONCERN TO EVERYONE.

OF COURSE THE WIND COMPANIES WILL CREATE JOBS IN WISCONSIN. BUT, WHAT HAPPENS WHEN THE WORK IS DONE AND THE PEOPLE CLOSE TO THE TURBINES START HAVING HEALTH PROBLEMS ? WHO IS GOING TO TAKE CARE OF THEM, PAY THEIR MEDICAL BILLS AND BUY THEIR PROPERTY. WILL YOU HELP THEM OR IGNORE THEIR PROBLEM ?

THIS IS A VERY SERIOUS SITUATION THAT IS BEFORE YOU. I ASK THAT YOU LISTEN TO ALL OF THE CONCERNS AND DO WHAT IS RIGHT. I LOVE ABRAHAM LINCOLN'S QUOTE—"NOTHING IS POLITICALLY RIGHT WHICH IS MORALLY WRONG". PUTTING PEOPLE'S HEALTH IN JEOPARDY IS MORALLY WRONG.

SINCERELY,



DARLENE LAWRENCE
4621 PLEASANT VALLEY RD
PLATTEVILLE WI 53818
608.348.4142

Notary: Jennifer M Marshall
Jennifer M Marshall
Grant County, Wisconsin
Commission Expiration: 2-3-13

February 7, 2011

Dear Committee,

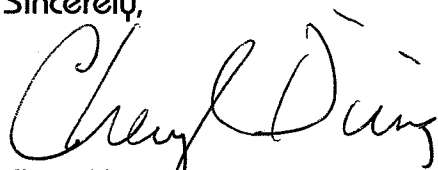
I am a longtime resident of the township of Glenmore. I would like to voice my concerns regarding the wind turbines which are already in our community and the wind turbines which are proposed. As a taxpayer of Glenmore, Brown County and the State of Wisconsin, I find it irresponsible of our elected officials to neglect several key points regarding these turbines and our farming community.

As a resident, I strongly suggest you take into account a setback of these wind turbines to a minimum of 1800 feet from any neighboring property line. And I stress **PROPERTY LINE!** I purchased my entire property, not just a portion of it. Anything less would infringe on my rights as a property owner.

I also have concerns regarding property values. It has been proven that property values decrease when wind turbines are brought into an area. A study by Appraisal One Group in 2009 showed a decrease of up to 40%! Just look at multiple homes in the Fond du Lac County wind complex. These homes have not sold because of their close proximity to wind turbines.

I strongly suggest you take these concerns into consideration. We need to protect the residents of Glenmore, Brown County and the State of Wisconsin!

Sincerely,

A handwritten signature in cursive script, appearing to read "Cheryl Diring".

Cheryl Diring
4001 Langes Corners Road
DePere, WI 54115

TOWN OF HOLLAND, WISCONSIN – BROWN COUNTY

REPRESENTED BY:

STEVE DESLAURIERS

2889 WAYSIDE ROAD

GREENLEAF, WI 54126

(TOWN OF HOLLAND)

920-785-3186

My name is Steve Deslauriers and I am here representing the Town of Holland in Brown County.

I have talked about the points of our town's ordinance in many other hearings, so today I will focus on how the PSC rules, if not suspended, will adversely affect my town.

I will start with talking about the differential setbacks in the PSC Rules - how the rules specify one wind turbine setback from property lines and another from homes. It is clear to see how these differential setbacks result in nothing less than government endorsed property takings - eliminating the safe use and development of land in the wind turbine safety buffer without any meaningful compensation. This flies in the face of the property rights that built this country and alone should be enough to suspend the PSC rules as written.

Then there is the content of the rules themselves. These are substantially the same rules that have forced people to walk away from their homes in Fond du Lac, required that homes in Kewaunee be bulldozed, and continue to affect the health of those who cannot afford to abandon the homes they have invested their life savings in. The PSC rules are not based on science, completely ignore the experiences of current wind project residents, and were a bold faced manipulation of the law that you, our legislature, demanded they follow. The state-wide standards drafted by the PSC place the health and safety of some residents, and some entire communities in jeopardy. This last weekend I visited my neighbor in Glenmore who now lives within 3400 feet of three 500 foot tall wind turbines – the closest being about 2700 feet away. She wears industrial earmuffs while in the house due the pounding headaches that she gets when at home - a new problem since the turbines went up and one that disappears when she leaves the area. The doctors say there is nothing wrong - I have spent time in this house and I beg to differ.

Then there is the ongoing cost to the State of Wisconsin that will be caused by the current PSC siting rules and fiscal irresponsibility of wind development. The wind energy industry cannot sustain development or employment without perpetual artificial financial support from taxpayers. The job creation cited by wind developers is at a great taxpayer expense – we can artificially create as many jobs as we want if we do so on the backs of taxpayers. This takes no innovation, drive, or fiscal responsibility – just taxpayer dollars. The rise in energy prices associated with every wind project that goes online will cost far more manufacturing jobs than the few artificially created subsidy jobs in the wind industry. The PSC rules set to go in to effect will create another government supported subsidy industry that will weigh on Wisconsin taxpayers for at least the next 3 decades (anticipated life of a wind project). All of

regulation and resolutions that put the Health Wisconsin Families ahead of the greed and misleading, unethical behavior of wind developers. There was not a SINGLE dissenting vote by any of the many Brown County committees that reviewed the Brown County Resolutions, including the diverse Board of Supervisors - and yet these resolutions were never addressed or even recognized by the Wind Siting Council. Brown County officials did not have the huge financial conflicts of interests that 9 of the 15 members of the Wind Siting Council have.

That leads me to talk about how the staffing of the Wind Siting Council did not follow the explicit direction of the legislature. The most important member was supposed to be a doctor with experience with wind development and a faculty member of the University of Wisconsin. Doctor Jevon McFadden was neither. Or the council member that was supposed to represent the general public, a 'regular joe'. This position was filled by Jenny Heinzen - a person whose career is completely dependent on the subsidy dollars pumped in to the wind industry. Jenny is also the President of RENEW - a nonprofit quasi environmental group largely funded by wind developers. In all, 9 of the 15 members were heavily conflicted - An obvious stacked deck that led to little meaningful discussion and virtually no compromise on the most important topics - setbacks and noise levels.

Thank you for calling this hearing and allowing the real and substantial concerns of residents across the state to be heard. Please SUSPEND the PSC rules.

Steve Deslauriers
Town of Holland

Chairperson Vukmir, Chairman Ott and Committee Members:

My name is Kim Egan, I am a landowner in SW Wisconsin. Our family owns a 4 generation farm west of Cuba City. I have met, spoke to and have represented more than 300 landowners who support Home Grown Wind Energy. Over 90% of them are Farmers who live and work on 3-4 generation family farms.

Most of these farmers will NOT be here today. You may never see the local wind supporters (Note: Over 80% of all local residents support wind) at hearings like this. They simply do not have the time. They truly feel it is their personal, individual and lawful right or privilege to host Wind Turbines.

They have waited over three years to see results. Legislators did their job and the PSC Unanimously voted to adopt PSC 128. The anti-wind folks and all individual rights groups were heard loud and clear over and over again in hearings like this and at the PSC. There has never been any documented Health and Public Safety issues tied to Wind. Why are we revisiting this issue again...What Statutory Authority allows this too happen?

NOTE...See statute 66.0403 or revisit the Ecker Bros decision in Calumet County.

I'm sure the Governor never intended to create even more stringent barriers on a local industry that has paced itself and waited 3 years. State energy companies reported they will need 1000 megawatts of locally produced wind power to fill 2015 RPS standards... Those ELECTRONS can stay in Wisconsin. The 1000 megawatts (10-12 projects) total nearly \$3 billion, including \$800 million in local construction costs. (Note: that's a lot of concrete)...And over 1000 jobs...!!

Wisconsin has the 13th best Wind Capacity of all states but we are LAST in the entire Midwest in Wind Production. Wisconsin is also 8th in US in Wind Manufacturing, but we haven't built a wind project west of Beaver Dam since 1999....

The Monfort Wind Farm CELEBRATED its 10 year anniversary last year! Have you been to the Tower Junction Inn - Restaurant or the Windmill Mobil Station?

Today you will hear many of the same old arguments and a new one...real estate. There is little to no urban sprawl in SW Wisconsin. The little towns like the Patch Groves and the Kielers remain unchanged. Wisconsin is still AG country.

(Note; We surveyed the residences that lie within one mile of the planned White Oak wind project near our family farm. We found only 6, maybe 7 homes that have been built in this 50 square mile area since 1980.) There is no urban sprawl here...

The 1000 megawatts of state needed wind energy will generate nearly \$8-9 million dollars to farmers and landowners annually. Another \$4 million goes to local townships and counties. All revenues are recurring...



A Division of The Boldt Company

N21 W23340 Ridgeview Parkway
Waukesha, WI 53188

262-544-9118 phone
www.boldt.com

Testimony to PSC 128

The Boldt Company is a large General Contractor / Construction Manager headquartered in the State of Wisconsin. In 2010, we put in place \$340,000,000 of work in Wisconsin. We directly employ an average of 1000 construction craft workers and approximately the same amount of subcontract workers on projects.

In today's market, we all understand the economic impact created by providing manufacturing, construction, operations, maintenance, development, transportation, and other jobs to the State of Wisconsin. I would like to expand on the impact that the wind power industry has on construction jobs.

In 2008 and 2009, Boldt installed over 700 wind turbines in the upper Midwest. This equates to approximately 1050 MW of power and included projects in Dodge and Fond du Lac counties. We are currently installing turbines at the Glacier Hills project in Columbia County.

On average, each wind turbine equates to 1325 man hours of craft labor. On a 100 unit wind farm, this equates to a payroll of over \$10,000,000. In addition to payroll, the projects are supported by the community based vendors who provide materials such as ready-mix concrete, stone products, fuel, housing and meals for field workers.

From a personal perspective, I grew up in rural South Western Wisconsin where several projects are being proposed. Members of my family and I are land owners very near to where wind farms are currently sited, and where additional sites are being proposed. While none of our family's land is being proposed as a site, we fully support the development of wind farms. We fully understand and appreciate the economic benefit wind turbine income affords the local farmers who continue to struggle to make a reasonable living off the land.

John Hale

Group President – Central Operations

The Boldt Company

N21 W23340 Ridgeview Parkway

Waukesha, WI 53188

262-446-7130

Dear Administrative Rules Committee Members,

2-9-11

Thank you to Governor Walker for seeing the need to protect WI citizens.

Concerning PSC 128 wind siting rules:

These rules are written to protect the wind industry not the public:

- Please suspend these rules.
- Call for a moratorium on wind development.
- Please investigate the problems occurring at wind facilities at present.
- Study the impact on humans of industrial wind facilities in Wisconsin.
- Perform a cost benefit analysis.
- Perform an environmental impact study on wildlife.
- These studies need to be unbiased and based on sound science.
- No PSC involvement.

Please include in wind siting rules to protect the public:

- Require Setbacks from non hosting property lines of one and one quarter mile. (Dr.'s Hanning, Pierpont and Nissenbaum)
- Require Property value agreement guarantees for any property located within two miles of a wind facility. (**McCann Appraisal, LLC written testimony re Setbacks & property values June 8 2010**)
- Noise limits of 5 dBA over ambient (**Simple guidelines for siting wind turbines to prevent health risks - Kamperman and James**)
- Stop all subsidies, grants, tax shelters and Shared Revenue Payments for the wind industry.

http://www.powermag.com/issues/departments/speaking_of_power/Spain-Is-Tilting-at-Windmills_1851.html

Trempealeau County Wind Ordinance written by citizens and passed by the County Board is thoughtful and protects property rights, health and safety of people. The Town of Union, WI Wind Ordinance is fully footnoted. Read these and see the reasoning behind the need for protection. It is interesting people living in these and many other communities see a the need for protection from industrial wind development but the PSC is blinded and sees only the need for more wind development even at the levels of extreme incompetence and extreme negligence. Read the Wind Siting Council Minority Report.

Thank you,
Deloras Vind
N26992 Tolokken Rd
Arcadia WI, 54612
davevind@hotmail.com

Hearing on PSC 128 (Clearinghouse Rule #10-057)
PSCW Wind Siting Rules

Joint Committee for Review of Administrative Rules
February 9, 2011

Testimony by Glen R. Schwalbach, P.E.
for
Towns of Glenmore, Morrison, and Wrightstown of Brown County

Thank you, Co-chairs and Committee Members for providing us this opportunity to comment upon the wind siting rules which could go into effect next month.

Our towns support suspension of these rules for two reasons. The towns have existing wind siting ordinances in which they have invested hours and hours of effort to ensure the safety and health of their residents. A March 1st deadline to convert to the state rules is not possible since any local ordinance change requires an open process by the planning commissions and the town boards and, then, via town public hearings.

Secondly, the previous legislative committees sent the draft rules back to the Public Service Commission because of some key concerns about safety and health protections. Instead of providing for more stringent requirements, the PSCW relaxed the setback provisions and reduced payments to non-participating property owners. Then, as you know, the lame-duck committees did not provide for public hearings on those changes.

Our towns also support having an opportunity, after suspension of the rules, to explain the good, bad, and ugly in the proposed rules based upon our research and experience.

Progress has been made but an essential element is still lacking. Rules or standards intended to protect the health and safety of people must be based upon scientific fact rather than scientific opinion. We still lack statistically-controlled epidemiological studies to assess the wind turbine impacts on humans and animals. There are peer-reviewed scientific studies which say that significant evidence of negative impacts exists. On the other hand, there are peer-reviewed scientific reports which stress that there is no true scientific proof that turbines are harmful. Both groups of authors, including our own State Board of Health, are correct. There just are no controlled scientific studies except one which was recently published. That one was not considered in promulgating our state rules.

Wisconsin has an opportunity to do epidemiological studies in their existing wind farms. The University of Wisconsin and the State Board of Health is capable of doing such studies. The time is ripe because 1) there are complaints of health issues from Wisconsin residents in or near existing wind farms, 2) studies are necessary to determine setbacks which are adequate but not extreme and 3) all

indications are that the Wisconsin utilities already have enough renewable generation planned for meeting the state requirement for 10% by 2015.

We call upon the wind energy industry to help fund such studies because the use of better science would improve their designs, speed their project application process, and help reduce their liability. I, personally, call upon the licensed Professional Engineers in the wind industry to remind themselves that, as P.E.'s, they have an ethical responsibility to the public which goes beyond obligations to their employers or their clients. Their designs and operational procedures must be based on good science. They should voice support for controlled studies.

Such studies are also important to Wisconsin residents since it is more likely that, in the future, continuing federal subsidies will prompt wind development in Wisconsin but the power will be sold and used in other states.

That said, we offer comments on some key fixes needed in the proposed rules.

Historically and reasonably, setbacks have been defined as a distance from property lines for structures or other land use--until wind turbine projects came along. Ironically, the state decided to allow wind turbines, which greatly exceeded traditional height restrictions for structures, to also have direct impact beyond the property line as to the neighbors' use of their land. Adequate setbacks from property lines are necessary not only for safety and health reasons but also to minimize financial impact for non-participating landowners.

Another concern is that the proposed rules do not allow the towns to decide the acceptable means to provide financial collateral for future decommissioning. In the proposed rules, the wind turbine owners get to decide that.

A third concern is that when wind projects are sold, the towns should have some authority to approve the new owners. Most likely, if the statutes still require 10% renewable energy, it will be the utilities which will be forced to buy the projects from the developers. But, if not, the towns need to have better protection from irresponsible owners.

A fourth concern is that the rules do not provide explicitly for local authority to protect the environment such as groundwater. County experts often know the sensitive areas and the risks they represent better than the DNR. This is a huge concern for our towns because of the nature of the Niagara Escarpment and its many karst features. Karsts are rock fissures which often provide a direct pathway to groundwater. One University of Wisconsin expert estimates only 10% to 20% of karsts have been found and officially mapped in Brown County.

And, the last concern is that the rules only apply directly to wind energy systems less than 100 megawatts. Legislation should provide for explicit protections for residents near the largest wind developments as well.

Thank you for your consideration.

To: Joint Committee for Review of Administrative Rules (JCRAR)

Date: February 9, 2011

Subject: Requested Suspension and revision of PSC AC-231 Wind Siting Rules

I am requesting that the PSC rules AC-231 for large wind turbines not be implemented on March 1, 2011 and that the rules be revised to protect the health and safety of the adjacent property owners and maintain their property rights.

I am also requesting that this letter be placed into record.

I live in Manitowoc county, our current ordinance(Chapter 24) has turbine placement measured from adjacent property lines and has sound measurements that apply anywhere on the adjacent property. This protects the rights of property that does not have an existing structure built on it. Manitowoc residences along with many other counties residences fully understand the takings of property rights associated with the PSC rules. Attached are three drawings that show the extent of the property takings allowed by the PSC rules. These are not hypothetical situations. Emerging Energies and Navitas have proposed turbine placements that closely follow what is depicted in the attached drawings. Their proposed turbine placements are public record in Manitowoc County.

I want you to look at attached drawing #3. Specifically, this shows what could have happened to me and is happening to people who have purchased land in the county to build a future home or homes. I had two young couples ask me what they should do, they are still paying for the land but the farm next to the land signed-up for turbines. This is not right.

Engineering studies show a setback of 2640 feet from property lines is necessary for addressing the health and safety aspects of a wind turbine installation. Any setback distance less than this from the adjacent property line is a compromise of the adjacent land owner's health and safety.

Many engineering studies show that the PSC rules for allowable noise are inadequate. The current PSC rules have no technical basis that the setback distances used would even support the noise requirements used in the rules. Commissioner Azar provided input during a public meeting that the PSC staff determined it would take a setback of 2200 feet to meet a 45 dB noise limit. How could the PSC rules than have a setback of 1.1 times the height from a property line?

There is no alignment between the PSC random numbers used for setback distances and the noise requirements, BUT these random setback numbers would be used as criteria for local ordinances. The PSC has not pursued obtaining engineering studies for the calculated safe distance associated with turbine blade failures, attached is a calculation that can be produced for turbine blade failure.

Many supporters of the PSC rules say the proposed 1800 foot setback from property lines would stop turbine construction. This is simply not true. Landowners can allow turbines to be placed closer to their property and can give easements if they feel it appropriate.

Many supporters of the rules say this will kill jobs. This is also quit the overstatement. Most Wind projects built to date have been built by obtaining easements.

I want to point out how I feel CLEAN Wisconsin speaks out of both sides of its mouth. First they say greater setbacks will cost wind turbine jobs but then they file a law suit to try and stop Point Beach Nuclear Plant from performing the Power Uprate project. Point Beach is a nuclear plant that does not create CO2 emissions. Point Beach power uprate has already generated approximately a million man-hours of work and will generate nearly two million more man-hours of work before work is completed. Point Beach Nuclear Plant is a merchant plant, these costs are not being passed onto the Wisconsin rate payers.

People in this state voted in the republicans because I believe the state was not supporting real businesses. I don't think wind projects are real businesses. They are only being pursued because of the large subsidies specific to the power they generate (which is passed to the consumer in the form higher electric rates and taxes) and the large financial incentives such as double capital depreciation and other tax benefits.

I want the legislature to change the rules that limit the amount of hydroelectric output that can be used towards the randomly created Renewable Portfolio Standard (RPS). I feel all megawatts of power generated by hydro plants should be applied to the RPS.

I also feel that the additional capacity created at Point Beach Nuclear plant should also count towards the RPS.

Feel free to contact me if you would like clarification of information submitted.

Respectfully,



Jeff Roberts

12113 Tannery Road

Mishicot, WI 54228

(920) 755-2736

Attachments:

3 drawings showing PSC rule effect on land -3 pages

"Debris Thrown Analysis" by Jeff Roberts, 13 pages

Official Energy Statistics from the United States Government

40 Acres

40 Acres

40 Acres

40 Acres

16 Acres

2.125 Acres

16 Acres

2.125 Acres

16 Acres

2.125 Acres

1320'-0"

550'

1250'

500' tall turbine

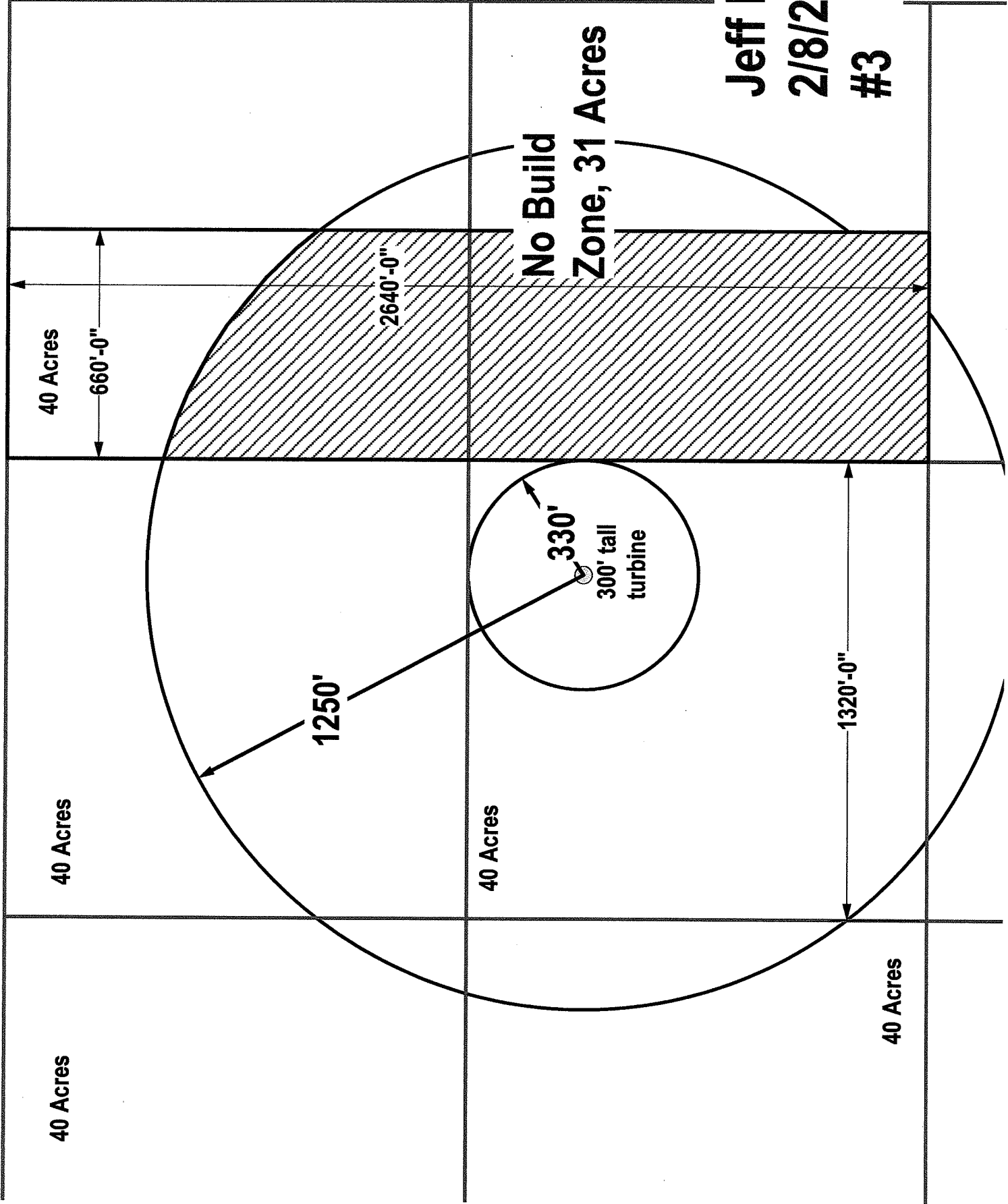
40 Acres, Turbine host

GRAPHIC ERROR 2,125 TRANSPOSED
WITH 16, 144

WITNESSES

A diagram of a circular turbine. A central point is labeled "300' tall turbine". A line segment from this point to the top edge of the circle is labeled "330'". The circle is tangent to a horizontal line at the top.

Jeff Roberts
2/8/2011
#3

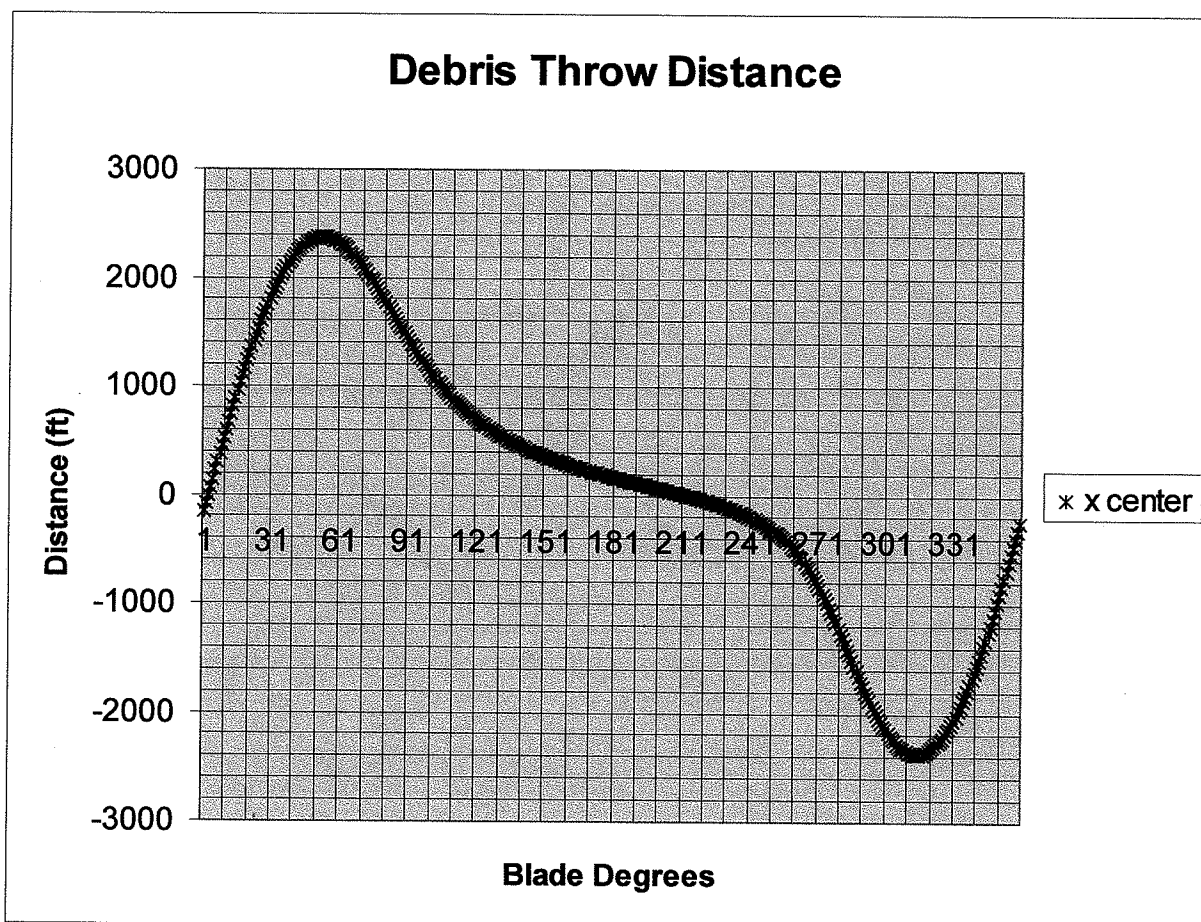


Debris Throw Analysis

Energy companies have come to our area and will not provide debris throw distances. Emerging Energies told me at the public meeting that the turbine blades do not fail and that debris throw is not a problem. There are many industry studies on debris throw distances for turbines, in fact guidance is provided by the turbine manufactures for safe distance based on debris throw. In an effort to provide a sanity check to numbers published by the turbine manufactures, a separate analysis is performed.

The analysis shows that debris thrown from the proposed turbine can travel significant distance.

There are 227 out of 360 degrees of debris release point that could possibly result in debris thrown greater than 1.1 times the height of the turbine (541.2 ft).



This chart is based on 328 foot (100 meter) diameter turbine with a hub height of 328 feet (100 meters) rotating at a speed of 15 rpm.

This is a worst case analysis and air resistance is not included. It should be noted that wind turbine blades are very aerodynamic.

The debris throw distances were calculated using standard principles of physics. The equation that describes motion is as follows.

$$\text{Distance} = V \times \cos(a) \times [V \times \sin(a) / G + [(v \times \sin(a))^2 / G^2 - 2 \times Y/G]^{.5}]$$

Where: V = is the tangential speed (ft/sec)
 a = the angle relative to horizontal
 G = the acceleration of gravity (32.2 ft/sec²)
 Y = the distance to the ground from the point of release

The distances of debris throw were corrected for the release point relative to the tower center. The distances are from the centerline of the tower base. The attached 11 pages (attachment 1) are the results of the calculation for each degree of blade angle.

The calculation was verified against available calculation provided at:
<http://hyperphysics.phy-astr.gsu.edu/hbase/traj.html#tra3>

The distance will increase upon an over speed event of the turbine.

This analysis shows that turbine size and rotor speed must be considered when placing turbines to meet the safety setbacks of the ordinance. Using a safe distance of 1.1 times the height of a turbine as a safety setback does not result in a safe installation.

This turbine will throw debris farther than a 1.1 time height distance 2 out of 3 times upon a blade failure.

The manufacturer numbers are not for the worst case debris throw distances.

Jeff Roberts

10/19/2008

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| Rotor Radius (ft) | Rotation angle (degrees) | Rotation angle (radians) | Tangential release angle (degrees) | Tangential release angle (radians) | Vehicle Height relative to hub (ft) | Horizontal distance relative to hub (ft) | Rotor speed (rpm) | Rotor tip speed (ft/sec) | Total distance from release point (ft) | Release height to ground (ft) | Distance of travel from tower (ft) |
|-------------------|--------------------------|--------------------------|------------------------------------|------------------------------------|-------------------------------------|--|-------------------|--------------------------|--|-------------------------------|------------------------------------|
| 164 | 0 | 0.000 | 90 | 1.571 | 0.00 | 164.00 | 15 | 257.61 | 0.00 | -328.00 | -164.00 |
| 164 | 1 | 0.017 | 89 | 1.553 | 2.86 | 163.98 | 15 | 257.61 | 77.30 | -330.86 | -86.67 |
| 164 | 2 | 0.035 | 88 | 1.536 | 5.72 | 163.90 | 15 | 257.61 | 154.60 | -333.72 | -9.30 |
| 164 | 3 | 0.052 | 87 | 1.518 | 8.58 | 163.78 | 15 | 257.61 | 231.82 | -336.58 | 68.05 |
| 164 | 4 | 0.070 | 86 | 1.501 | 11.44 | 163.60 | 15 | 257.61 | 308.87 | -339.44 | 145.27 |
| 164 | 5 | 0.087 | 85 | 1.484 | 14.29 | 163.38 | 15 | 257.61 | 385.67 | -342.29 | 222.30 |
| 164 | 6 | 0.105 | 84 | 1.466 | 17.14 | 163.10 | 15 | 257.61 | 462.14 | -345.14 | 299.03 |
| 164 | 7 | 0.122 | 83 | 1.449 | 19.99 | 162.78 | 15 | 257.61 | 538.18 | -347.99 | 375.40 |
| 164 | 8 | 0.140 | 82 | 1.431 | 22.82 | 162.40 | 15 | 257.61 | 613.72 | -350.82 | 451.31 |
| 164 | 9 | 0.157 | 81 | 1.414 | 25.66 | 161.98 | 15 | 257.61 | 688.67 | -353.66 | 526.69 |
| 164 | 10 | 0.175 | 80 | 1.396 | 28.48 | 161.51 | 15 | 257.61 | 762.97 | -356.48 | 601.46 |
| 164 | 11 | 0.192 | 79 | 1.379 | 31.29 | 160.99 | 15 | 257.61 | 836.51 | -359.29 | 675.52 |
| 164 | 12 | 0.209 | 78 | 1.361 | 34.10 | 160.42 | 15 | 257.61 | 909.23 | -362.10 | 748.82 |
| 164 | 13 | 0.227 | 77 | 1.344 | 36.89 | 159.80 | 15 | 257.61 | 981.05 | -364.89 | 821.25 |
| 164 | 14 | 0.244 | 76 | 1.326 | 39.68 | 159.13 | 15 | 257.61 | 1051.89 | -367.68 | 892.76 |
| 164 | 15 | 0.262 | 75 | 1.309 | 42.45 | 158.41 | 15 | 257.61 | 1121.68 | -370.45 | 963.26 |
| 164 | 16 | 0.279 | 74 | 1.292 | 45.20 | 157.65 | 15 | 257.61 | 1190.33 | -373.20 | 1032.69 |
| 164 | 17 | 0.297 | 73 | 1.274 | 47.95 | 156.83 | 15 | 257.61 | 1257.79 | -375.95 | 1100.96 |
| 164 | 18 | 0.314 | 72 | 1.257 | 50.68 | 155.97 | 15 | 257.61 | 1323.99 | -378.68 | 1168.01 |
| 164 | 19 | 0.332 | 71 | 1.239 | 53.39 | 155.07 | 15 | 257.61 | 1388.84 | -381.39 | 1233.77 |
| 164 | 20 | 0.349 | 70 | 1.222 | 56.09 | 154.11 | 15 | 257.61 | 1452.29 | -384.09 | 1298.18 |
| 164 | 21 | 0.367 | 69 | 1.204 | 58.77 | 153.11 | 15 | 257.61 | 1514.27 | -386.77 | 1361.16 |
| 164 | 22 | 0.384 | 68 | 1.187 | 61.44 | 152.06 | 15 | 257.61 | 1574.72 | -389.44 | 1422.66 |
| 164 | 23 | 0.401 | 67 | 1.169 | 64.08 | 150.96 | 15 | 257.61 | 1633.58 | -392.08 | 1482.61 |
| 164 | 24 | 0.419 | 66 | 1.152 | 66.70 | 149.82 | 15 | 257.61 | 1690.79 | -394.70 | 1540.97 |
| 164 | 25 | 0.436 | 65 | 1.134 | 69.31 | 148.63 | 15 | 257.61 | 1746.29 | -397.31 | 1597.66 |
| 164 | 26 | 0.454 | 64 | 1.117 | 71.89 | 147.40 | 15 | 257.61 | 1800.04 | -399.89 | 1652.64 |
| 164 | 27 | 0.471 | 63 | 1.100 | 74.45 | 146.13 | 15 | 257.61 | 1851.98 | -402.45 | 1705.85 |
| 164 | 28 | 0.489 | 62 | 1.082 | 76.99 | 144.80 | 15 | 257.61 | 1902.06 | -404.99 | 1757.26 |
| 164 | 29 | 0.506 | 61 | 1.065 | 79.51 | 143.44 | 15 | 257.61 | 1950.24 | -407.51 | 1806.80 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|----|-------|----|-------|--------|--------|----|--------|---------|---------|---------|
| 164 | 30 | 0.524 | 60 | 1.047 | 82.00 | 142.03 | 15 | 257.61 | 1996.47 | -410.00 | 1854.45 |
| 164 | 31 | 0.541 | 59 | 1.030 | 84.47 | 140.58 | 15 | 257.61 | 2040.72 | -412.47 | 1900.15 |
| 164 | 32 | 0.559 | 58 | 1.012 | 86.91 | 139.08 | 15 | 257.61 | 2082.95 | -414.91 | 1943.87 |
| 164 | 33 | 0.576 | 57 | 0.995 | 89.32 | 137.54 | 15 | 257.61 | 2123.12 | -417.32 | 1985.58 |
| 164 | 34 | 0.593 | 56 | 0.977 | 91.71 | 135.96 | 15 | 257.61 | 2161.21 | -419.71 | 2025.24 |
| 164 | 35 | 0.611 | 55 | 0.960 | 94.07 | 134.34 | 15 | 257.61 | 2197.17 | -422.07 | 2062.83 |
| 164 | 36 | 0.628 | 54 | 0.942 | 96.40 | 132.68 | 15 | 257.61 | 2231.00 | -424.40 | 2098.32 |
| 164 | 37 | 0.646 | 53 | 0.925 | 98.70 | 130.98 | 15 | 257.61 | 2262.66 | -426.70 | 2131.69 |
| 164 | 38 | 0.663 | 52 | 0.908 | 100.97 | 129.23 | 15 | 257.61 | 2292.14 | -428.97 | 2162.91 |
| 164 | 39 | 0.681 | 51 | 0.890 | 103.21 | 127.45 | 15 | 257.61 | 2319.43 | -431.21 | 2191.98 |
| 164 | 40 | 0.698 | 50 | 0.873 | 105.42 | 125.63 | 15 | 257.61 | 2344.50 | -433.42 | 2218.87 |
| 164 | 41 | 0.716 | 49 | 0.855 | 107.59 | 123.77 | 15 | 257.61 | 2367.35 | -435.59 | 2243.58 |
| 164 | 42 | 0.733 | 48 | 0.838 | 109.74 | 121.88 | 15 | 257.61 | 2387.98 | -437.74 | 2266.11 |
| 164 | 43 | 0.750 | 47 | 0.820 | 111.85 | 119.94 | 15 | 257.61 | 2406.38 | -439.85 | 2286.44 |
| 164 | 44 | 0.768 | 46 | 0.803 | 113.92 | 117.97 | 15 | 257.61 | 2422.56 | -441.92 | 2304.58 |
| 164 | 45 | 0.785 | 45 | 0.785 | 115.97 | 115.97 | 15 | 257.61 | 2436.51 | -443.97 | 2320.54 |
| 164 | 46 | 0.803 | 44 | 0.768 | 117.97 | 113.92 | 15 | 257.61 | 2448.24 | -445.97 | 2334.32 |
| 164 | 47 | 0.820 | 43 | 0.750 | 119.94 | 111.85 | 15 | 257.61 | 2457.77 | -447.94 | 2345.93 |
| 164 | 48 | 0.838 | 42 | 0.733 | 121.88 | 109.74 | 15 | 257.61 | 2465.12 | -449.88 | 2355.38 |
| 164 | 49 | 0.855 | 41 | 0.716 | 123.77 | 107.59 | 15 | 257.61 | 2470.28 | -451.77 | 2362.69 |
| 164 | 50 | 0.873 | 40 | 0.698 | 125.63 | 105.42 | 15 | 257.61 | 2473.30 | -453.63 | 2367.89 |
| 164 | 51 | 0.890 | 39 | 0.681 | 127.45 | 103.21 | 15 | 257.61 | 2474.20 | -455.45 | 2370.99 |
| 164 | 52 | 0.908 | 38 | 0.663 | 129.23 | 100.97 | 15 | 257.61 | 2472.99 | -457.23 | 2372.02 |
| 164 | 53 | 0.925 | 37 | 0.646 | 130.98 | 98.70 | 15 | 257.61 | 2469.72 | -458.98 | 2371.02 |
| 164 | 54 | 0.942 | 36 | 0.628 | 132.68 | 96.40 | 15 | 257.61 | 2464.41 | -460.68 | 2368.02 |
| 164 | 55 | 0.960 | 35 | 0.611 | 134.34 | 94.07 | 15 | 257.61 | 2457.11 | -462.34 | 2363.05 |
| 164 | 56 | 0.977 | 34 | 0.593 | 135.96 | 91.71 | 15 | 257.61 | 2447.86 | -463.96 | 2356.15 |
| 164 | 57 | 0.995 | 33 | 0.576 | 137.54 | 89.32 | 15 | 257.61 | 2436.70 | -465.54 | 2347.38 |
| 164 | 58 | 1.012 | 32 | 0.559 | 139.08 | 86.91 | 15 | 257.61 | 2423.68 | -467.08 | 2336.77 |
| 164 | 59 | 1.030 | 31 | 0.541 | 140.58 | 84.47 | 15 | 257.61 | 2408.85 | -468.58 | 2324.38 |
| 164 | 60 | 1.047 | 30 | 0.524 | 142.03 | 82.00 | 15 | 257.61 | 2392.26 | -470.03 | 2310.26 |
| 164 | 61 | 1.065 | 29 | 0.506 | 143.44 | 79.51 | 15 | 257.61 | 2373.97 | -471.44 | 2294.46 |
| 164 | 62 | 1.082 | 28 | 0.489 | 144.80 | 76.99 | 15 | 257.61 | 2354.04 | -472.80 | 2277.04 |
| 164 | 63 | 1.100 | 27 | 0.471 | 146.13 | 74.45 | 15 | 257.61 | 2332.53 | -474.13 | 2258.07 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|----|-------|----|--------|--------|--------|----|--------|---------|---------|---------|
| 164 | 64 | 1.117 | 26 | 0.454 | 147.40 | 71.89 | 15 | 257.61 | 2309.50 | -475.40 | 2237.61 |
| 164 | 65 | 1.134 | 25 | 0.436 | 148.63 | 69.31 | 15 | 257.61 | 2285.03 | -476.63 | 2215.72 |
| 164 | 66 | 1.152 | 24 | 0.419 | 149.82 | 66.70 | 15 | 257.61 | 2259.17 | -477.82 | 2192.47 |
| 164 | 67 | 1.169 | 23 | 0.401 | 150.96 | 64.08 | 15 | 257.61 | 2232.01 | -478.96 | 2167.93 |
| 164 | 68 | 1.187 | 22 | 0.384 | 152.06 | 61.44 | 15 | 257.61 | 2203.62 | -480.06 | 2142.19 |
| 164 | 69 | 1.204 | 21 | 0.367 | 153.11 | 58.77 | 15 | 257.61 | 2174.07 | -481.11 | 2115.30 |
| 164 | 70 | 1.222 | 20 | 0.349 | 154.11 | 56.09 | 15 | 257.61 | 2143.44 | -482.11 | 2087.34 |
| 164 | 71 | 1.239 | 19 | 0.332 | 155.07 | 53.39 | 15 | 257.61 | 2111.80 | -483.07 | 2058.40 |
| 164 | 72 | 1.257 | 18 | 0.314 | 155.97 | 50.68 | 15 | 257.61 | 2079.23 | -483.97 | 2028.55 |
| 164 | 73 | 1.274 | 17 | 0.297 | 156.83 | 47.95 | 15 | 257.61 | 2045.82 | -484.83 | 1997.88 |
| 164 | 74 | 1.292 | 16 | 0.279 | 157.65 | 45.20 | 15 | 257.61 | 2011.65 | -485.65 | 1966.45 |
| 164 | 75 | 1.309 | 15 | 0.262 | 158.41 | 42.45 | 15 | 257.61 | 1976.79 | -486.41 | 1934.35 |
| 164 | 76 | 1.326 | 14 | 0.244 | 159.13 | 39.68 | 15 | 257.61 | 1941.33 | -487.13 | 1901.66 |
| 164 | 77 | 1.344 | 13 | 0.227 | 159.80 | 36.89 | 15 | 257.61 | 1905.35 | -487.80 | 1868.45 |
| 164 | 78 | 1.361 | 12 | 0.209 | 160.42 | 34.10 | 15 | 257.61 | 1868.92 | -488.42 | 1834.82 |
| 164 | 79 | 1.379 | 11 | 0.192 | 160.99 | 31.29 | 15 | 257.61 | 1832.13 | -488.99 | 1800.83 |
| 164 | 80 | 1.396 | 10 | 0.175 | 161.51 | 28.48 | 15 | 257.61 | 1795.05 | -489.51 | 1766.57 |
| 164 | 81 | 1.414 | 9 | 0.157 | 161.98 | 25.66 | 15 | 257.61 | 1757.76 | -489.98 | 1732.10 |
| 164 | 82 | 1.431 | 8 | 0.140 | 162.40 | 22.82 | 15 | 257.61 | 1720.33 | -490.40 | 1697.51 |
| 164 | 83 | 1.449 | 7 | 0.122 | 162.78 | 19.99 | 15 | 257.61 | 1682.84 | -490.78 | 1662.86 |
| 164 | 84 | 1.466 | 6 | 0.105 | 163.10 | 17.14 | 15 | 257.61 | 1645.36 | -491.10 | 1628.22 |
| 164 | 85 | 1.484 | 5 | 0.087 | 163.38 | 14.29 | 15 | 257.61 | 1607.95 | -491.38 | 1593.65 |
| 164 | 86 | 1.501 | 4 | 0.070 | 163.60 | 11.44 | 15 | 257.61 | 1570.67 | -491.60 | 1559.23 |
| 164 | 87 | 1.518 | 3 | 0.052 | 163.78 | 8.58 | 15 | 257.61 | 1533.59 | -491.78 | 1525.01 |
| 164 | 88 | 1.536 | 2 | 0.035 | 163.90 | 5.72 | 15 | 257.61 | 1496.76 | -491.90 | 1491.04 |
| 164 | 89 | 1.553 | 1 | 0.017 | 163.98 | 2.86 | 15 | 257.61 | 1460.24 | -491.98 | 1457.38 |
| 164 | 90 | 1.571 | 0 | 0.000 | 164.00 | 0.00 | 15 | 257.61 | 1424.08 | -492.00 | 1424.08 |
| 164 | 91 | 1.588 | -1 | -0.017 | 163.98 | -2.86 | 15 | 257.61 | 1388.31 | -491.98 | 1391.18 |
| 164 | 92 | 1.606 | -2 | -0.035 | 163.90 | -5.72 | 15 | 257.61 | 1353.00 | -491.90 | 1358.72 |
| 164 | 93 | 1.623 | -3 | -0.052 | 163.78 | -8.58 | 15 | 257.61 | 1318.16 | -491.78 | 1326.74 |
| 164 | 94 | 1.641 | -4 | -0.070 | 163.60 | -11.44 | 15 | 257.61 | 1283.84 | -491.60 | 1295.28 |
| 164 | 95 | 1.658 | -5 | -0.087 | 163.38 | -14.29 | 15 | 257.61 | 1250.06 | -491.38 | 1264.36 |
| 164 | 96 | 1.676 | -6 | -0.105 | 163.10 | -17.14 | 15 | 257.61 | 1216.86 | -491.10 | 1234.00 |
| 164 | 97 | 1.693 | -7 | -0.122 | 162.78 | -19.99 | 15 | 257.61 | 1184.25 | -490.78 | 1204.24 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|-----|--------|--------|---------|----|--------|---------|---------|---------|
| 164 | 98 | 1.710 | -8 | -0.140 | 162.40 | -22.82 | 15 | 257.61 | 1152.25 | -490.40 | 1175.08 |
| 164 | 99 | 1.728 | -9 | -0.157 | 161.98 | -25.66 | 15 | 257.61 | 1120.89 | -489.98 | 1146.54 |
| 164 | 100 | 1.745 | -10 | -0.175 | 161.51 | -28.48 | 15 | 257.61 | 1090.16 | -489.51 | 1118.63 |
| 164 | 101 | 1.763 | -11 | -0.192 | 160.99 | -31.29 | 15 | 257.61 | 1060.07 | -488.99 | 1091.37 |
| 164 | 102 | 1.780 | -12 | -0.209 | 160.42 | -34.10 | 15 | 257.61 | 1030.65 | -488.42 | 1064.74 |
| 164 | 103 | 1.798 | -13 | -0.227 | 159.80 | -36.89 | 15 | 257.61 | 1001.88 | -487.80 | 1038.77 |
| 164 | 104 | 1.815 | -14 | -0.244 | 159.13 | -39.68 | 15 | 257.61 | 973.76 | -487.13 | 1013.44 |
| 164 | 105 | 1.833 | -15 | -0.262 | 158.41 | -42.45 | 15 | 257.61 | 946.31 | -486.41 | 988.75 |
| 164 | 106 | 1.850 | -16 | -0.279 | 157.65 | -45.20 | 15 | 257.61 | 919.50 | -485.65 | 964.71 |
| 164 | 107 | 1.868 | -17 | -0.297 | 156.83 | -47.95 | 15 | 257.61 | 893.34 | -484.83 | 941.29 |
| 164 | 108 | 1.885 | -18 | -0.314 | 155.97 | -50.68 | 15 | 257.61 | 867.83 | -483.97 | 918.50 |
| 164 | 109 | 1.902 | -19 | -0.332 | 155.07 | -53.39 | 15 | 257.61 | 842.94 | -483.07 | 896.33 |
| 164 | 110 | 1.920 | -20 | -0.349 | 154.11 | -56.09 | 15 | 257.61 | 818.67 | -482.11 | 874.76 |
| 164 | 111 | 1.937 | -21 | -0.367 | 153.11 | -58.77 | 15 | 257.61 | 795.01 | -481.11 | 853.78 |
| 164 | 112 | 1.955 | -22 | -0.384 | 152.06 | -61.44 | 15 | 257.61 | 771.95 | -480.06 | 833.39 |
| 164 | 113 | 1.972 | -23 | -0.401 | 150.96 | -64.08 | 15 | 257.61 | 749.48 | -478.96 | 813.56 |
| 164 | 114 | 1.990 | -24 | -0.419 | 149.82 | -66.70 | 15 | 257.61 | 727.58 | -477.82 | 794.28 |
| 164 | 115 | 2.007 | -25 | -0.436 | 148.63 | -69.31 | 15 | 257.61 | 706.23 | -476.63 | 775.54 |
| 164 | 116 | 2.025 | -26 | -0.454 | 147.40 | -71.89 | 15 | 257.61 | 685.43 | -475.40 | 757.33 |
| 164 | 117 | 2.042 | -27 | -0.471 | 146.13 | -74.45 | 15 | 257.61 | 665.17 | -474.13 | 739.62 |
| 164 | 118 | 2.059 | -28 | -0.489 | 144.80 | -76.99 | 15 | 257.61 | 645.41 | -472.80 | 722.41 |
| 164 | 119 | 2.077 | -29 | -0.506 | 143.44 | -79.51 | 15 | 257.61 | 626.17 | -471.44 | 705.67 |
| 164 | 120 | 2.094 | -30 | -0.524 | 142.03 | -82.00 | 15 | 257.61 | 607.41 | -470.03 | 689.41 |
| 164 | 121 | 2.112 | -31 | -0.541 | 140.58 | -84.47 | 15 | 257.61 | 589.12 | -468.58 | 673.59 |
| 164 | 122 | 2.129 | -32 | -0.559 | 139.08 | -86.91 | 15 | 257.61 | 571.29 | -467.08 | 658.20 |
| 164 | 123 | 2.147 | -33 | -0.576 | 137.54 | -89.32 | 15 | 257.61 | 553.91 | -465.54 | 643.23 |
| 164 | 124 | 2.164 | -34 | -0.593 | 135.96 | -91.71 | 15 | 257.61 | 536.96 | -463.96 | 628.67 |
| 164 | 125 | 2.182 | -35 | -0.611 | 134.34 | -94.07 | 15 | 257.61 | 520.44 | -462.34 | 614.50 |
| 164 | 126 | 2.199 | -36 | -0.628 | 132.68 | -96.40 | 15 | 257.61 | 504.31 | -460.68 | 600.71 |
| 164 | 127 | 2.217 | -37 | -0.646 | 130.98 | -98.70 | 15 | 257.61 | 488.59 | -458.98 | 587.28 |
| 164 | 128 | 2.234 | -38 | -0.663 | 129.23 | -100.97 | 15 | 257.61 | 473.24 | -457.23 | 574.21 |
| 164 | 129 | 2.251 | -39 | -0.681 | 127.45 | -103.21 | 15 | 257.61 | 458.26 | -455.45 | 561.47 |
| 164 | 130 | 2.269 | -40 | -0.698 | 125.63 | -105.42 | 15 | 257.61 | 443.64 | -453.63 | 549.06 |
| 164 | 131 | 2.286 | -41 | -0.716 | 123.77 | -107.59 | 15 | 257.61 | 429.37 | -451.77 | 536.97 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|-----|--------|--------|---------|----|--------|--------|---------|--------|
| 164 | 132 | 2.304 | -42 | -0.733 | 121.88 | -109.74 | 15 | 257.61 | 415.44 | -449.88 | 525.17 |
| 164 | 133 | 2.321 | -43 | -0.750 | 119.94 | -111.85 | 15 | 257.61 | 401.82 | -447.94 | 513.67 |
| 164 | 134 | 2.339 | -44 | -0.768 | 117.97 | -113.92 | 15 | 257.61 | 388.53 | -445.97 | 502.45 |
| 164 | 135 | 2.356 | -45 | -0.785 | 115.97 | -115.97 | 15 | 257.61 | 375.54 | -443.97 | 491.50 |
| 164 | 136 | 2.374 | -46 | -0.803 | 113.92 | -117.97 | 15 | 257.61 | 362.84 | -441.92 | 480.81 |
| 164 | 137 | 2.391 | -47 | -0.820 | 111.85 | -119.94 | 15 | 257.61 | 350.43 | -439.85 | 470.38 |
| 164 | 138 | 2.409 | -48 | -0.838 | 109.74 | -121.88 | 15 | 257.61 | 338.30 | -437.74 | 460.18 |
| 164 | 139 | 2.426 | -49 | -0.855 | 107.59 | -123.77 | 15 | 257.61 | 326.44 | -435.59 | 450.21 |
| 164 | 140 | 2.443 | -50 | -0.873 | 105.42 | -125.63 | 15 | 257.61 | 314.84 | -433.42 | 440.47 |
| 164 | 141 | 2.461 | -51 | -0.890 | 103.21 | -127.45 | 15 | 257.61 | 303.50 | -431.21 | 430.95 |
| 164 | 142 | 2.478 | -52 | -0.908 | 100.97 | -129.23 | 15 | 257.61 | 292.39 | -428.97 | 421.63 |
| 164 | 143 | 2.496 | -53 | -0.925 | 98.70 | -130.98 | 15 | 257.61 | 281.53 | -426.70 | 412.51 |
| 164 | 144 | 2.513 | -54 | -0.942 | 96.40 | -132.68 | 15 | 257.61 | 270.90 | -424.40 | 403.58 |
| 164 | 145 | 2.531 | -55 | -0.960 | 94.07 | -134.34 | 15 | 257.61 | 260.50 | -422.07 | 394.84 |
| 164 | 146 | 2.548 | -56 | -0.977 | 91.71 | -135.96 | 15 | 257.61 | 250.31 | -419.71 | 386.27 |
| 164 | 147 | 2.566 | -57 | -0.995 | 89.32 | -137.54 | 15 | 257.61 | 240.33 | -417.32 | 377.88 |
| 164 | 148 | 2.583 | -58 | -1.012 | 86.91 | -139.08 | 15 | 257.61 | 230.56 | -414.91 | 369.64 |
| 164 | 149 | 2.601 | -59 | -1.030 | 84.47 | -140.58 | 15 | 257.61 | 221.00 | -412.47 | 361.57 |
| 164 | 150 | 2.618 | -60 | -1.047 | 82.00 | -142.03 | 15 | 257.61 | 211.62 | -410.00 | 353.65 |
| 164 | 151 | 2.635 | -61 | -1.065 | 79.51 | -143.44 | 15 | 257.61 | 202.44 | -407.51 | 345.88 |
| 164 | 152 | 2.653 | -62 | -1.082 | 76.99 | -144.80 | 15 | 257.61 | 193.44 | -404.99 | 338.24 |
| 164 | 153 | 2.670 | -63 | -1.100 | 74.45 | -146.13 | 15 | 257.61 | 184.62 | -402.45 | 330.74 |
| 164 | 154 | 2.688 | -64 | -1.117 | 71.89 | -147.40 | 15 | 257.61 | 175.97 | -399.89 | 323.38 |
| 164 | 155 | 2.705 | -65 | -1.134 | 69.31 | -148.63 | 15 | 257.61 | 167.50 | -397.31 | 316.13 |
| 164 | 156 | 2.723 | -66 | -1.152 | 66.70 | -149.82 | 15 | 257.61 | 159.19 | -394.70 | 309.01 |
| 164 | 157 | 2.740 | -67 | -1.169 | 64.08 | -150.96 | 15 | 257.61 | 151.04 | -392.08 | 302.00 |
| 164 | 158 | 2.758 | -68 | -1.187 | 61.44 | -152.06 | 15 | 257.61 | 143.05 | -389.44 | 295.11 |
| 164 | 159 | 2.775 | -69 | -1.204 | 58.77 | -153.11 | 15 | 257.61 | 135.21 | -386.77 | 288.32 |
| 164 | 160 | 2.793 | -70 | -1.222 | 56.09 | -154.11 | 15 | 257.61 | 127.52 | -384.09 | 281.63 |
| 164 | 161 | 2.810 | -71 | -1.239 | 53.39 | -155.07 | 15 | 257.61 | 119.98 | -381.39 | 275.04 |
| 164 | 162 | 2.827 | -72 | -1.257 | 50.68 | -155.97 | 15 | 257.61 | 112.58 | -378.68 | 268.55 |
| 164 | 163 | 2.845 | -73 | -1.274 | 47.95 | -156.83 | 15 | 257.61 | 105.32 | -375.95 | 262.15 |
| 164 | 164 | 2.862 | -74 | -1.292 | 45.20 | -157.65 | 15 | 257.61 | 98.19 | -373.20 | 255.83 |
| 164 | 165 | 2.880 | -75 | -1.309 | 42.45 | -158.41 | 15 | 257.61 | 91.19 | -370.45 | 249.60 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|--------|---------|----|--------|--------|---------|--------|
| 164 | 166 | 2.897 | -76 | -1.326 | 39.68 | -159.13 | 15 | 257.61 | 84.32 | -367.68 | 243.45 |
| 164 | 167 | 2.915 | -77 | -1.344 | 36.89 | -159.80 | 15 | 257.61 | 77.58 | -364.89 | 237.38 |
| 164 | 168 | 2.932 | -78 | -1.361 | 34.10 | -160.42 | 15 | 257.61 | 70.96 | -362.10 | 231.38 |
| 164 | 169 | 2.950 | -79 | -1.379 | 31.29 | -160.99 | 15 | 257.61 | 64.46 | -359.29 | 225.44 |
| 164 | 170 | 2.967 | -80 | -1.396 | 28.48 | -161.51 | 15 | 257.61 | 58.07 | -356.48 | 219.58 |
| 164 | 171 | 2.985 | -81 | -1.414 | 25.66 | -161.98 | 15 | 257.61 | 51.80 | -353.66 | 213.78 |
| 164 | 172 | 3.002 | -82 | -1.431 | 22.82 | -162.40 | 15 | 257.61 | 45.64 | -350.82 | 208.04 |
| 164 | 173 | 3.019 | -83 | -1.449 | 19.99 | -162.78 | 15 | 257.61 | 39.58 | -347.99 | 202.36 |
| 164 | 174 | 3.037 | -84 | -1.466 | 17.14 | -163.10 | 15 | 257.61 | 33.64 | -345.14 | 196.74 |
| 164 | 175 | 3.054 | -85 | -1.484 | 14.29 | -163.38 | 15 | 257.61 | 27.79 | -342.29 | 191.16 |
| 164 | 176 | 3.072 | -86 | -1.501 | 11.44 | -163.60 | 15 | 257.61 | 22.04 | -339.44 | 185.64 |
| 164 | 177 | 3.089 | -87 | -1.518 | 8.58 | -163.78 | 15 | 257.61 | 16.39 | -336.58 | 180.17 |
| 164 | 178 | 3.107 | -88 | -1.536 | 5.72 | -163.90 | 15 | 257.61 | 10.84 | -333.72 | 174.74 |
| 164 | 179 | 3.124 | -89 | -1.553 | 2.86 | -163.98 | 15 | 257.61 | 5.37 | -330.86 | 169.35 |
| 164 | 180 | 3.142 | -90 | -1.571 | 0.00 | -164.00 | 15 | 257.61 | 0.00 | -328.00 | 164.00 |
| 164 | 181 | 3.159 | -91 | -1.588 | -2.86 | -163.98 | 15 | 257.61 | -5.29 | -325.14 | 158.69 |
| 164 | 182 | 3.176 | -92 | -1.606 | -5.72 | -163.90 | 15 | 257.61 | -10.49 | -322.28 | 153.41 |
| 164 | 183 | 3.194 | -93 | -1.623 | -8.58 | -163.78 | 15 | 257.61 | -15.61 | -319.42 | 148.17 |
| 164 | 184 | 3.211 | -94 | -1.641 | -11.44 | -163.60 | 15 | 257.61 | -20.65 | -316.56 | 142.95 |
| 164 | 185 | 3.229 | -95 | -1.658 | -14.29 | -163.38 | 15 | 257.61 | -25.61 | -313.71 | 137.76 |
| 164 | 186 | 3.246 | -96 | -1.676 | -17.14 | -163.10 | 15 | 257.61 | -30.50 | -310.86 | 132.60 |
| 164 | 187 | 3.264 | -97 | -1.693 | -19.99 | -162.78 | 15 | 257.61 | -35.32 | -308.01 | 127.46 |
| 164 | 188 | 3.281 | -98 | -1.710 | -22.82 | -162.40 | 15 | 257.61 | -40.06 | -305.18 | 122.34 |
| 164 | 189 | 3.299 | -99 | -1.728 | -25.66 | -161.98 | 15 | 257.61 | -44.74 | -302.34 | 117.24 |
| 164 | 190 | 3.316 | -100 | -1.745 | -28.48 | -161.51 | 15 | 257.61 | -49.36 | -299.52 | 112.15 |
| 164 | 191 | 3.334 | -101 | -1.763 | -31.29 | -160.99 | 15 | 257.61 | -53.91 | -296.71 | 107.08 |
| 164 | 192 | 3.351 | -102 | -1.780 | -34.10 | -160.42 | 15 | 257.61 | -58.40 | -293.90 | 102.01 |
| 164 | 193 | 3.368 | -103 | -1.798 | -36.89 | -159.80 | 15 | 257.61 | -62.84 | -291.11 | 96.96 |
| 164 | 194 | 3.386 | -104 | -1.815 | -39.68 | -159.13 | 15 | 257.61 | -67.22 | -288.32 | 91.91 |
| 164 | 195 | 3.403 | -105 | -1.833 | -42.45 | -158.41 | 15 | 257.61 | -71.55 | -285.55 | 86.87 |
| 164 | 196 | 3.421 | -106 | -1.850 | -45.20 | -157.65 | 15 | 257.61 | -75.83 | -282.80 | 81.82 |
| 164 | 197 | 3.438 | -107 | -1.868 | -47.95 | -156.83 | 15 | 257.61 | -80.06 | -280.05 | 76.78 |
| 164 | 198 | 3.456 | -108 | -1.885 | -50.68 | -155.97 | 15 | 257.61 | -84.25 | -277.32 | 71.73 |
| 164 | 199 | 3.473 | -109 | -1.902 | -53.39 | -155.07 | 15 | 257.61 | -88.40 | -274.61 | 66.67 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|---------|---------|----|--------|---------|---------|---------|
| 164 | 200 | 3.491 | -110 | -1.920 | -56.09 | -154.11 | 15 | 257.61 | -92.51 | -271.91 | 61.60 |
| 164 | 201 | 3.508 | -111 | -1.937 | -58.77 | -153.11 | 15 | 257.61 | -96.58 | -269.23 | 56.52 |
| 164 | 202 | 3.526 | -112 | -1.955 | -61.44 | -152.06 | 15 | 257.61 | -100.63 | -266.56 | 51.43 |
| 164 | 203 | 3.543 | -113 | -1.972 | -64.08 | -150.96 | 15 | 257.61 | -104.64 | -263.92 | 46.32 |
| 164 | 204 | 3.560 | -114 | -1.990 | -66.70 | -149.82 | 15 | 257.61 | -108.63 | -261.30 | 41.19 |
| 164 | 205 | 3.578 | -115 | -2.007 | -69.31 | -148.63 | 15 | 257.61 | -112.60 | -258.69 | 36.04 |
| 164 | 206 | 3.595 | -116 | -2.025 | -71.89 | -147.40 | 15 | 257.61 | -116.55 | -256.11 | 30.85 |
| 164 | 207 | 3.613 | -117 | -2.042 | -74.45 | -146.13 | 15 | 257.61 | -120.48 | -253.55 | 25.64 |
| 164 | 208 | 3.630 | -118 | -2.059 | -76.99 | -144.80 | 15 | 257.61 | -124.40 | -251.01 | 20.40 |
| 164 | 209 | 3.648 | -119 | -2.077 | -79.51 | -143.44 | 15 | 257.61 | -128.32 | -248.49 | 15.12 |
| 164 | 210 | 3.665 | -120 | -2.094 | -82.00 | -142.03 | 15 | 257.61 | -132.23 | -246.00 | 9.80 |
| 164 | 211 | 3.683 | -121 | -2.112 | -84.47 | -140.58 | 15 | 257.61 | -136.14 | -243.53 | 4.43 |
| 164 | 212 | 3.700 | -122 | -2.129 | -86.91 | -139.08 | 15 | 257.61 | -140.06 | -241.09 | -0.98 |
| 164 | 213 | 3.718 | -123 | -2.147 | -89.32 | -137.54 | 15 | 257.61 | -143.99 | -238.68 | -6.45 |
| 164 | 214 | 3.735 | -124 | -2.164 | -91.71 | -135.96 | 15 | 257.61 | -147.93 | -236.29 | -11.97 |
| 164 | 215 | 3.752 | -125 | -2.182 | -94.07 | -134.34 | 15 | 257.61 | -151.89 | -233.93 | -17.55 |
| 164 | 216 | 3.770 | -126 | -2.199 | -96.40 | -132.68 | 15 | 257.61 | -155.87 | -231.60 | -23.20 |
| 164 | 217 | 3.787 | -127 | -2.217 | -98.70 | -130.98 | 15 | 257.61 | -159.89 | -229.30 | -28.91 |
| 164 | 218 | 3.805 | -128 | -2.234 | -100.97 | -129.23 | 15 | 257.61 | -163.94 | -227.03 | -34.70 |
| 164 | 219 | 3.822 | -129 | -2.251 | -103.21 | -127.45 | 15 | 257.61 | -168.03 | -224.79 | -40.58 |
| 164 | 220 | 3.840 | -130 | -2.269 | -105.42 | -125.63 | 15 | 257.61 | -172.17 | -222.58 | -46.53 |
| 164 | 221 | 3.857 | -131 | -2.286 | -107.59 | -123.77 | 15 | 257.61 | -176.36 | -220.41 | -52.58 |
| 164 | 222 | 3.875 | -132 | -2.304 | -109.74 | -121.88 | 15 | 257.61 | -180.61 | -218.26 | -58.73 |
| 164 | 223 | 3.892 | -133 | -2.321 | -111.85 | -119.94 | 15 | 257.61 | -184.93 | -216.15 | -64.99 |
| 164 | 224 | 3.910 | -134 | -2.339 | -113.92 | -117.97 | 15 | 257.61 | -189.33 | -214.08 | -71.36 |
| 164 | 225 | 3.927 | -135 | -2.356 | -115.97 | -115.97 | 15 | 257.61 | -193.81 | -212.03 | -77.84 |
| 164 | 226 | 3.944 | -136 | -2.374 | -117.97 | -113.92 | 15 | 257.61 | -198.38 | -210.03 | -84.46 |
| 164 | 227 | 3.962 | -137 | -2.391 | -119.94 | -111.85 | 15 | 257.61 | -203.06 | -208.06 | -91.21 |
| 164 | 228 | 3.979 | -138 | -2.409 | -121.88 | -109.74 | 15 | 257.61 | -207.85 | -206.12 | -98.11 |
| 164 | 229 | 3.997 | -139 | -2.426 | -123.77 | -107.59 | 15 | 257.61 | -212.76 | -204.23 | -105.16 |
| 164 | 230 | 4.014 | -140 | -2.443 | -125.63 | -105.42 | 15 | 257.61 | -217.80 | -202.37 | -112.38 |
| 164 | 231 | 4.032 | -141 | -2.461 | -127.45 | -103.21 | 15 | 257.61 | -222.99 | -200.55 | -119.78 |
| 164 | 232 | 4.049 | -142 | -2.478 | -129.23 | -100.97 | 15 | 257.61 | -228.34 | -198.77 | -127.37 |
| 164 | 233 | 4.067 | -143 | -2.496 | -130.98 | -98.70 | 15 | 257.61 | -233.85 | -197.02 | -135.16 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|---------|--------|----|--------|---------|---------|---------|
| 164 | 234 | 4.084 | -144 | -2.513 | -132.68 | -96.40 | 15 | 257.61 | -239.56 | -195.32 | -143.16 |
| 164 | 235 | 4.102 | -145 | -2.531 | -134.34 | -94.07 | 15 | 257.61 | -245.46 | -193.66 | -151.40 |
| 164 | 236 | 4.119 | -146 | -2.548 | -135.96 | -91.71 | 15 | 257.61 | -251.58 | -192.04 | -159.88 |
| 164 | 237 | 4.136 | -147 | -2.566 | -137.54 | -89.32 | 15 | 257.61 | -257.94 | -190.46 | -168.62 |
| 164 | 238 | 4.154 | -148 | -2.583 | -139.08 | -86.91 | 15 | 257.61 | -264.55 | -188.92 | -177.65 |
| 164 | 239 | 4.171 | -149 | -2.601 | -140.58 | -84.47 | 15 | 257.61 | -271.44 | -187.42 | -186.97 |
| 164 | 240 | 4.189 | -150 | -2.618 | -142.03 | -82.00 | 15 | 257.61 | -278.62 | -185.97 | -196.62 |
| 164 | 241 | 4.206 | -151 | -2.635 | -143.44 | -79.51 | 15 | 257.61 | -286.12 | -184.56 | -206.61 |
| 164 | 242 | 4.224 | -152 | -2.653 | -144.80 | -76.99 | 15 | 257.61 | -293.97 | -183.20 | -216.97 |
| 164 | 243 | 4.241 | -153 | -2.670 | -146.13 | -74.45 | 15 | 257.61 | -302.18 | -181.87 | -227.73 |
| 164 | 244 | 4.259 | -154 | -2.688 | -147.40 | -71.89 | 15 | 257.61 | -310.80 | -180.60 | -238.91 |
| 164 | 245 | 4.276 | -155 | -2.705 | -148.63 | -69.31 | 15 | 257.61 | -319.85 | -179.37 | -250.54 |
| 164 | 246 | 4.294 | -156 | -2.723 | -149.82 | -66.70 | 15 | 257.61 | -329.37 | -178.18 | -262.66 |
| 164 | 247 | 4.311 | -157 | -2.740 | -150.96 | -64.08 | 15 | 257.61 | -339.38 | -177.04 | -275.30 |
| 164 | 248 | 4.328 | -158 | -2.758 | -152.06 | -61.44 | 15 | 257.61 | -349.94 | -175.94 | -288.50 |
| 164 | 249 | 4.346 | -159 | -2.775 | -153.11 | -58.77 | 15 | 257.61 | -361.07 | -174.89 | -302.30 |
| 164 | 250 | 4.363 | -160 | -2.793 | -154.11 | -56.09 | 15 | 257.61 | -372.83 | -173.89 | -316.74 |
| 164 | 251 | 4.381 | -161 | -2.810 | -155.07 | -53.39 | 15 | 257.61 | -385.26 | -172.93 | -331.87 |
| 164 | 252 | 4.398 | -162 | -2.827 | -155.97 | -50.68 | 15 | 257.61 | -398.41 | -172.03 | -347.73 |
| 164 | 253 | 4.416 | -163 | -2.845 | -156.83 | -47.95 | 15 | 257.61 | -412.33 | -171.17 | -364.39 |
| 164 | 254 | 4.433 | -164 | -2.862 | -157.65 | -45.20 | 15 | 257.61 | -427.08 | -170.35 | -381.88 |
| 164 | 255 | 4.451 | -165 | -2.880 | -158.41 | -42.45 | 15 | 257.61 | -442.71 | -169.59 | -400.27 |
| 164 | 256 | 4.468 | -166 | -2.897 | -159.13 | -39.68 | 15 | 257.61 | -459.29 | -168.87 | -419.61 |
| 164 | 257 | 4.485 | -167 | -2.915 | -159.80 | -36.89 | 15 | 257.61 | -476.87 | -168.20 | -439.98 |
| 164 | 258 | 4.503 | -168 | -2.932 | -160.42 | -34.10 | 15 | 257.61 | -495.51 | -167.58 | -461.42 |
| 164 | 259 | 4.520 | -169 | -2.950 | -160.99 | -31.29 | 15 | 257.61 | -515.29 | -167.01 | -484.00 |
| 164 | 260 | 4.538 | -170 | -2.967 | -161.51 | -28.48 | 15 | 257.61 | -536.26 | -166.49 | -507.78 |
| 164 | 261 | 4.555 | -171 | -2.985 | -161.98 | -25.66 | 15 | 257.61 | -558.48 | -166.02 | -532.82 |
| 164 | 262 | 4.573 | -172 | -3.002 | -162.40 | -22.82 | 15 | 257.61 | -582.01 | -165.60 | -559.18 |
| 164 | 263 | 4.590 | -173 | -3.019 | -162.78 | -19.99 | 15 | 257.61 | -606.90 | -165.22 | -586.91 |
| 164 | 264 | 4.608 | -174 | -3.037 | -163.10 | -17.14 | 15 | 257.61 | -633.20 | -164.90 | -616.06 |
| 164 | 265 | 4.625 | -175 | -3.054 | -163.38 | -14.29 | 15 | 257.61 | -660.96 | -164.62 | -646.67 |
| 164 | 266 | 4.643 | -176 | -3.072 | -163.60 | -11.44 | 15 | 257.61 | -690.20 | -164.40 | -678.76 |
| 164 | 267 | 4.660 | -177 | -3.089 | -163.78 | -8.58 | 15 | 257.61 | -720.94 | -164.22 | -712.36 |

Performed by:
Jeff Roberts

Attachment 1

Turbine Debris Throw Distance

Date: 10/19/2008

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|---------|-------|----|--------|----------|---------|----------|
| 164 | 268 | 4.677 | -178 | -3.107 | -163.90 | -5.72 | 15 | 257.61 | -753.19 | -164.10 | -747.47 |
| 164 | 269 | 4.695 | -179 | -3.124 | -163.98 | -2.86 | 15 | 257.61 | -786.95 | -164.02 | -784.09 |
| 164 | 270 | 4.712 | -180 | -3.142 | -164.00 | 0.00 | 15 | 257.61 | -822.19 | -164.00 | -822.19 |
| 164 | 271 | 4.730 | -181 | -3.159 | -163.98 | 2.86 | 15 | 257.61 | -858.88 | -164.02 | -861.74 |
| 164 | 272 | 4.747 | -182 | -3.176 | -163.90 | 5.72 | 15 | 257.61 | -896.96 | -164.10 | -902.68 |
| 164 | 273 | 4.765 | -183 | -3.194 | -163.78 | 8.58 | 15 | 257.61 | -936.37 | -164.22 | -944.96 |
| 164 | 274 | 4.782 | -184 | -3.211 | -163.60 | 11.44 | 15 | 257.61 | -977.03 | -164.40 | -988.47 |
| 164 | 275 | 4.800 | -185 | -3.229 | -163.38 | 14.29 | 15 | 257.61 | -1018.84 | -164.62 | -1033.14 |
| 164 | 276 | 4.817 | -186 | -3.246 | -163.10 | 17.14 | 15 | 257.61 | -1061.70 | -164.90 | -1078.85 |
| 164 | 277 | 4.835 | -187 | -3.264 | -162.78 | 19.99 | 15 | 257.61 | -1105.49 | -165.22 | -1125.48 |
| 164 | 278 | 4.852 | -188 | -3.281 | -162.40 | 22.82 | 15 | 257.61 | -1150.09 | -165.60 | -1172.91 |
| 164 | 279 | 4.869 | -189 | -3.299 | -161.98 | 25.66 | 15 | 257.61 | -1195.35 | -166.02 | -1221.01 |
| 164 | 280 | 4.887 | -190 | -3.316 | -161.51 | 28.48 | 15 | 257.61 | -1241.15 | -166.49 | -1269.63 |
| 164 | 281 | 4.904 | -191 | -3.334 | -160.99 | 31.29 | 15 | 257.61 | -1287.34 | -167.01 | -1318.64 |
| 164 | 282 | 4.922 | -192 | -3.351 | -160.42 | 34.10 | 15 | 257.61 | -1333.79 | -167.58 | -1367.88 |
| 164 | 283 | 4.939 | -193 | -3.368 | -159.80 | 36.89 | 15 | 257.61 | -1380.34 | -168.20 | -1417.23 |
| 164 | 284 | 4.957 | -194 | -3.386 | -159.13 | 39.68 | 15 | 257.61 | -1426.86 | -168.87 | -1466.53 |
| 164 | 285 | 4.974 | -195 | -3.403 | -158.41 | 42.45 | 15 | 257.61 | -1473.20 | -169.59 | -1515.65 |
| 164 | 286 | 4.992 | -196 | -3.421 | -157.65 | 45.20 | 15 | 257.61 | -1519.23 | -170.35 | -1564.43 |
| 164 | 287 | 5.009 | -197 | -3.438 | -156.83 | 47.95 | 15 | 257.61 | -1564.81 | -171.17 | -1612.76 |
| 164 | 288 | 5.027 | -198 | -3.456 | -155.97 | 50.68 | 15 | 257.61 | -1609.82 | -172.03 | -1660.50 |
| 164 | 289 | 5.044 | -199 | -3.473 | -155.07 | 53.39 | 15 | 257.61 | -1654.12 | -172.93 | -1707.52 |
| 164 | 290 | 5.061 | -200 | -3.491 | -154.11 | 56.09 | 15 | 257.61 | -1697.60 | -173.89 | -1753.69 |
| 164 | 291 | 5.079 | -201 | -3.508 | -153.11 | 58.77 | 15 | 257.61 | -1740.13 | -174.89 | -1798.90 |
| 164 | 292 | 5.096 | -202 | -3.526 | -152.06 | 61.44 | 15 | 257.61 | -1781.61 | -175.94 | -1843.04 |
| 164 | 293 | 5.114 | -203 | -3.543 | -150.96 | 64.08 | 15 | 257.61 | -1821.92 | -177.04 | -1886.00 |
| 164 | 294 | 5.131 | -204 | -3.560 | -149.82 | 66.70 | 15 | 257.61 | -1860.97 | -178.18 | -1927.67 |
| 164 | 295 | 5.149 | -205 | -3.578 | -148.63 | 69.31 | 15 | 257.61 | -1898.65 | -179.37 | -1967.95 |
| 164 | 296 | 5.166 | -206 | -3.595 | -147.40 | 71.89 | 15 | 257.61 | -1934.87 | -180.60 | -2006.76 |
| 164 | 297 | 5.184 | -207 | -3.613 | -146.13 | 74.45 | 15 | 257.61 | -1969.54 | -181.87 | -2044.00 |
| 164 | 298 | 5.201 | -208 | -3.630 | -144.80 | 76.99 | 15 | 257.61 | -2002.59 | -183.20 | -2079.58 |
| 164 | 299 | 5.219 | -209 | -3.648 | -143.44 | 79.51 | 15 | 257.61 | -2033.92 | -184.56 | -2113.43 |
| 164 | 300 | 5.236 | -210 | -3.665 | -142.03 | 82.00 | 15 | 257.61 | -2063.47 | -185.97 | -2145.47 |
| 164 | 301 | 5.253 | -211 | -3.683 | -140.58 | 84.47 | 15 | 257.61 | -2091.17 | -187.42 | -2175.63 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|---------|--------|----|--------|----------|---------|----------|
| 164 | 302 | 5.271 | -212 | -3.700 | -139.08 | 86.91 | 15 | 257.61 | -2116.94 | -188.92 | -2203.85 |
| 164 | 303 | 5.288 | -213 | -3.718 | -137.54 | 89.32 | 15 | 257.61 | -2140.73 | -190.46 | -2230.05 |
| 164 | 304 | 5.306 | -214 | -3.735 | -135.96 | 91.71 | 15 | 257.61 | -2162.48 | -192.04 | -2254.19 |
| 164 | 305 | 5.323 | -215 | -3.752 | -134.34 | 94.07 | 15 | 257.61 | -2182.14 | -193.66 | -2276.21 |
| 164 | 306 | 5.341 | -216 | -3.770 | -132.68 | 96.40 | 15 | 257.61 | -2199.66 | -195.32 | -2296.05 |
| 164 | 307 | 5.358 | -217 | -3.787 | -130.98 | 98.70 | 15 | 257.61 | -2214.99 | -197.02 | -2313.68 |
| 164 | 308 | 5.376 | -218 | -3.805 | -129.23 | 100.97 | 15 | 257.61 | -2228.09 | -198.77 | -2329.06 |
| 164 | 309 | 5.393 | -219 | -3.822 | -127.45 | 103.21 | 15 | 257.61 | -2238.92 | -200.55 | -2342.13 |
| 164 | 310 | 5.411 | -220 | -3.840 | -125.63 | 105.42 | 15 | 257.61 | -2247.46 | -202.37 | -2352.88 |
| 164 | 311 | 5.428 | -221 | -3.857 | -123.77 | 107.59 | 15 | 257.61 | -2253.67 | -204.23 | -2361.26 |
| 164 | 312 | 5.445 | -222 | -3.875 | -121.88 | 109.74 | 15 | 257.61 | -2257.53 | -206.12 | -2367.26 |
| 164 | 313 | 5.463 | -223 | -3.892 | -119.94 | 111.85 | 15 | 257.61 | -2259.01 | -208.06 | -2370.86 |
| 164 | 314 | 5.480 | -224 | -3.910 | -117.97 | 113.92 | 15 | 257.61 | -2258.10 | -210.03 | -2372.02 |
| 164 | 315 | 5.498 | -225 | -3.927 | -115.97 | 115.97 | 15 | 257.61 | -2254.78 | -212.03 | -2370.74 |
| 164 | 316 | 5.515 | -226 | -3.944 | -113.92 | 117.97 | 15 | 257.61 | -2249.04 | -214.08 | -2367.01 |
| 164 | 317 | 5.533 | -227 | -3.962 | -111.85 | 119.94 | 15 | 257.61 | -2240.88 | -216.15 | -2360.82 |
| 164 | 318 | 5.550 | -228 | -3.979 | -109.74 | 121.88 | 15 | 257.61 | -2230.29 | -218.26 | -2352.16 |
| 164 | 319 | 5.568 | -229 | -3.997 | -107.59 | 123.77 | 15 | 257.61 | -2217.27 | -220.41 | -2341.04 |
| 164 | 320 | 5.585 | -230 | -4.014 | -105.42 | 125.63 | 15 | 257.61 | -2201.82 | -222.58 | -2327.46 |
| 164 | 321 | 5.603 | -231 | -4.032 | -103.21 | 127.45 | 15 | 257.61 | -2183.96 | -224.79 | -2311.41 |
| 164 | 322 | 5.620 | -232 | -4.049 | -100.97 | 129.23 | 15 | 257.61 | -2163.69 | -227.03 | -2292.92 |
| 164 | 323 | 5.637 | -233 | -4.067 | -98.70 | 130.98 | 15 | 257.61 | -2141.02 | -229.30 | -2272.00 |
| 164 | 324 | 5.655 | -234 | -4.084 | -96.40 | 132.68 | 15 | 257.61 | -2115.97 | -231.60 | -2248.65 |
| 164 | 325 | 5.672 | -235 | -4.102 | -94.07 | 134.34 | 15 | 257.61 | -2088.57 | -233.93 | -2222.91 |
| 164 | 326 | 5.690 | -236 | -4.119 | -91.71 | 135.96 | 15 | 257.61 | -2058.83 | -236.29 | -2194.79 |
| 164 | 327 | 5.707 | -237 | -4.136 | -89.32 | 137.54 | 15 | 257.61 | -2026.78 | -238.68 | -2164.32 |
| 164 | 328 | 5.725 | -238 | -4.154 | -86.91 | 139.08 | 15 | 257.61 | -1992.45 | -241.09 | -2131.53 |
| 164 | 329 | 5.742 | -239 | -4.171 | -84.47 | 140.58 | 15 | 257.61 | -1955.87 | -243.53 | -2096.45 |
| 164 | 330 | 5.760 | -240 | -4.189 | -82.00 | 142.03 | 15 | 257.61 | -1917.08 | -246.00 | -2059.11 |
| 164 | 331 | 5.777 | -241 | -4.206 | -79.51 | 143.44 | 15 | 257.61 | -1876.12 | -248.49 | -2019.56 |
| 164 | 332 | 5.794 | -242 | -4.224 | -76.99 | 144.80 | 15 | 257.61 | -1833.03 | -251.01 | -1977.83 |
| 164 | 333 | 5.812 | -243 | -4.241 | -74.45 | 146.13 | 15 | 257.61 | -1787.84 | -253.55 | -1933.97 |
| 164 | 334 | 5.829 | -244 | -4.259 | -71.89 | 147.40 | 15 | 257.61 | -1740.61 | -256.11 | -1888.02 |
| 164 | 335 | 5.847 | -245 | -4.276 | -69.31 | 148.63 | 15 | 257.61 | -1691.39 | -258.69 | -1840.03 |

Performed by:
Jeff Roberts

Date: 10/19/2008

Attachment 1

Turbine Debris Throw Distance

| | | | | | | | | | | | |
|-----|-----|-------|------|--------|--------|--------|----|--------|----------|---------|----------|
| 164 | 336 | 5.864 | -246 | -4.294 | -66.70 | 149.82 | 15 | 257.61 | -1640.23 | -261.30 | -1790.05 |
| 164 | 337 | 5.882 | -247 | -4.311 | -64.08 | 150.96 | 15 | 257.61 | -1587.18 | -263.92 | -1738.14 |
| 164 | 338 | 5.899 | -248 | -4.328 | -61.44 | 152.06 | 15 | 257.61 | -1532.30 | -266.56 | -1684.35 |
| 164 | 339 | 5.917 | -249 | -4.346 | -58.77 | 153.11 | 15 | 257.61 | -1475.64 | -269.23 | -1628.75 |
| 164 | 340 | 5.934 | -250 | -4.363 | -56.09 | 154.11 | 15 | 257.61 | -1417.27 | -271.91 | -1571.38 |
| 164 | 341 | 5.952 | -251 | -4.381 | -53.39 | 155.07 | 15 | 257.61 | -1357.26 | -274.61 | -1512.32 |
| 164 | 342 | 5.969 | -252 | -4.398 | -50.68 | 155.97 | 15 | 257.61 | -1295.66 | -277.32 | -1451.63 |
| 164 | 343 | 5.986 | -253 | -4.416 | -47.95 | 156.83 | 15 | 257.61 | -1232.54 | -280.05 | -1389.37 |
| 164 | 344 | 6.004 | -254 | -4.433 | -45.20 | 157.65 | 15 | 257.61 | -1167.97 | -282.80 | -1325.62 |
| 164 | 345 | 6.021 | -255 | -4.451 | -42.45 | 158.41 | 15 | 257.61 | -1102.03 | -285.55 | -1260.44 |
| 164 | 346 | 6.039 | -256 | -4.468 | -39.68 | 159.13 | 15 | 257.61 | -1034.78 | -288.32 | -1193.91 |
| 164 | 347 | 6.056 | -257 | -4.485 | -36.89 | 159.80 | 15 | 257.61 | -966.31 | -291.11 | -1126.10 |
| 164 | 348 | 6.074 | -258 | -4.503 | -34.10 | 160.42 | 15 | 257.61 | -896.67 | -293.90 | -1057.09 |
| 164 | 349 | 6.091 | -259 | -4.520 | -31.29 | 160.99 | 15 | 257.61 | -825.96 | -296.71 | -986.95 |
| 164 | 350 | 6.109 | -260 | -4.538 | -28.48 | 161.51 | 15 | 257.61 | -754.25 | -299.52 | -915.76 |
| 164 | 351 | 6.126 | -261 | -4.555 | -25.66 | 161.98 | 15 | 257.61 | -681.62 | -302.34 | -843.60 |
| 164 | 352 | 6.144 | -262 | -4.573 | -22.82 | 162.40 | 15 | 257.61 | -608.14 | -305.18 | -770.55 |
| 164 | 353 | 6.161 | -263 | -4.590 | -19.99 | 162.78 | 15 | 257.61 | -533.91 | -308.01 | -696.69 |
| 164 | 354 | 6.178 | -264 | -4.608 | -17.14 | 163.10 | 15 | 257.61 | -459.00 | -310.86 | -622.10 |
| 164 | 355 | 6.196 | -265 | -4.625 | -14.29 | 163.38 | 15 | 257.61 | -383.50 | -313.71 | -546.87 |
| 164 | 356 | 6.213 | -266 | -4.643 | -11.44 | 163.60 | 15 | 257.61 | -307.48 | -316.56 | -471.08 |
| 164 | 357 | 6.231 | -267 | -4.660 | -8.58 | 163.78 | 15 | 257.61 | -231.04 | -319.42 | -394.81 |
| 164 | 358 | 6.248 | -268 | -4.677 | -5.72 | 163.90 | 15 | 257.61 | -154.25 | -322.28 | -318.15 |
| 164 | 359 | 6.266 | -269 | -4.695 | -2.86 | 163.98 | 15 | 257.61 | -77.21 | -325.14 | -241.19 |

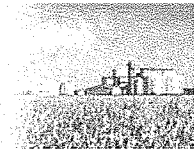


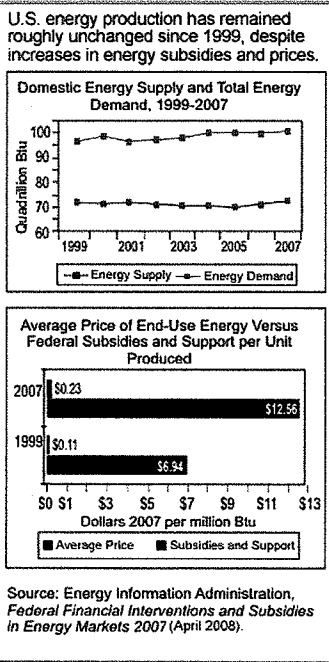
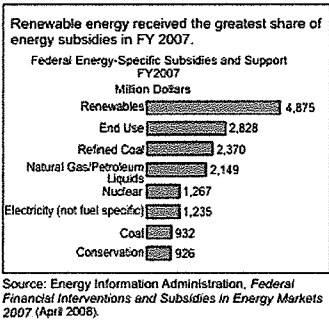
Energy in Brief — *What everyone should know about energy*

Last Reviewed: September 8, 2008

How much does the Federal Government spend on energy-specific subsidies and support?

The Federal Government spent an estimated \$16.6 billion in energy-specific subsidies and support programs in Fiscal Year (FY) 2007. Energy-specific subsidies have more than doubled since FY 1999.





A **subsidy** represents a transfer of Federal Government resources to the buyer or seller of a good or service that has the effect of reducing the price paid, increasing the price received, or reducing the cost of production of the good or service. Put simply, the Federal Government promotes targeted energy outcomes, such as production of a specific fuel or promotion of conservation and energy efficiency by energy consumers through incentives such as tax credits, grants, and low interest loans.

Did You Know?

The estimated value of production tax credits to wind producers in FY 2007 was \$666 million. The benefit was distributed over an estimated 27.7 million megawatthours, making wind power the largest beneficiary of production tax credits among all renewable technologies.

In FY 2007, most primary energy production received some type of energy-specific subsidy, as did conservation- and efficiency-related activities.¹ Subsidies to renewable energy resources² have been growing most rapidly. In FY 1999, renewable energy received \$1.4 billion in subsidies. By FY 2007, subsidies to renewable energy of all forms grew to \$4.9 billion. Ethanol production received \$3.0 billion in blender's credits under the Volumetric Ethanol Excise Tax Credit, exceeding any conventional or renewable fuel. Certain fossil fuels are also heavily subsidized. In FY 2007, refined coal (chemically enhanced to reduce certain emissions) received about \$2.4 billion. Subsidies for refined coal are expected to decline as a result of modifications to the Internal Revenue Code that were enacted in the Energy Policy Act of 2005.

Have Subsidies Affected Prices or Production?

Between 1999 and 2007, the average real price of total energy per British thermal unit (Btu)³ consumed increased more than 80%. Meanwhile, total energy consumption or demand, including imports, grew by about 5%. Most subsidies and support to energy producers should stimulate supply; so too should higher prices and rising energy demand. Yet in 2007, the United States supplied roughly 72 quadrillion Btu from domestic resources, about the same amount as in 1999. This leaves the impression that energy subsidies had little effect on net domestic production other than to help prevent further declines. But the enactment of various production-oriented tax incentives in the Energy Policy Act of 2005 and subsequent legislation may have contributed to the slight increase in primary energy production over the last two years.

Some portion of production-related subsidies may result in one primary energy source being substituted for another. Between 1999 and 2007, the only primary energy source for which production increased every year was wind power. Over this period, the Btu equivalent of electricity produced by wind increased at a yearly rate of almost 32%, compared with 0.1% per year for coal and 0.3% per year for natural gas.⁴ Other subsidies like loan guarantees for financing power plants require lengthy lead times: often there is a lag between the Federal government's expenditure and commercial production. The \$3.8 billion of conservation and end-use efficiency subsidies reduce energy demand and do not promote primary energy or electricity production.

How Do Federal Subsidies and Support Affect Market Behavior?

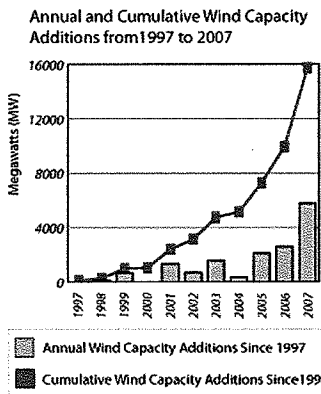
Subsidies and support can encourage producers to bring new technologies to market until manufacturers are able to produce the new technology in large quantities at costs competitive with established commercial technologies.

The periodic expiration and extension of the production tax credit (PTC) for wind power since 1992 illustrates the effect of tax incentives. Between 1997 and 2007, nearly 16,000 megawatts (MW) of wind capacity have been installed. The Energy Policy Act of 2005 extended the PTC to wind facilities placed in service before January 1, 2008. Subsequently, 8,438 MW of wind capacity was placed in service in 2006 and 2007.

There are several alternative ways to compare subsidies across fuels. In FY 2007, wind power received subsidies and support valued at \$23.37 per megawatthour (MWh). Refined coal and solar had even higher subsidies per MWh produced. The estimated subsidies for traditional primary energy sources used for electricity production were significant in total dollars. It is estimated that coal received \$854 million, nuclear received \$1,267 million, and natural gas and petroleum liquids received \$227 million. However, these traditional forms of generation produce most of the Nation's electricity, resulting in subsidies and support per unit of production of between \$0.25 and \$1.69 per megawatthour.

Up to now, the PTC has been a significant factor in encouraging wind capacity. In the future, other factors will also influence the decision to build wind capacity. Twenty-seven States have adopted mandatory renewable portfolio standards requiring that 4% to 25% of electricity sales be provided from renewables by certain dates ranging from 2009 to 2025. Technological improvements resulting in larger wind turbines, as well as higher prices for fossil fuels used in traditional generation, should enhance the financial feasibility of wind power.

Following the extension of the production tax credit in 2005, wind capacity increased 8,438 Megawatts (MW) in 2006 and 2007.



Source: Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 2007* (April 2008).

Rankings of subsidies and support based on absolute amount and amounts per megawatthour of generation differ widely, reflecting substantial differences in the amount of generation across fuels.

Subsidies and Support to Electric Production by Selected Primary Energy Sources

| Primary Energy Source | FY 2007 Net Generation (billion kilowatthours) | Subsidies and Support Allocated to Electric Generation (million FY 2007 dollars) | Subsidies and Support per Unit of Production (dollars/megawatthour) |
|-----------------------------------|--|--|---|
| Natural Gas and Petroleum Liquids | 919 | 227 | 0.25 |
| Coal | 1,946 | 854 | 0.44 |
| Hydroelectric | 258 | 174 | 0.67 |
| Biomass | 40 | 36 | 0.89 |
| Geothermal | 15 | 14 | 0.92 |
| Nuclear | 794 | 1,267 | 1.59 |
| Wind | 31 | 724 | 23.37 |
| Solar | 1 | 174 | 24.34 |
| Refined Coal | 72 | 2,156 | 29.81 |

Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 2007*, SR/CNEAF/2008-1 (Washington, DC, 2008).

- Learn More
- Report to Congress: *Federal Financial Interventions and Subsidies in Energy Markets 2007*
 - Facts and Figures on Ethanol Production

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1 In addition to benefitting from the energy-specific subsidy and support programs considered in this brief, energy activities may also benefit from subsidies and programs available to a broad range of energy and non-energy sectors.

2 Renewable energy resources are energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy resources include biomass, hydropower, geothermal, solar, wind, ocean thermal, wave action, and tidal action

3 A Btu equals the quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

4 Energy Information Administration, *Monthly Energy Review*, May 2008, Tables 1.2, DOE/EIA-0035(200805) (Washington, DC, May 2008).

| PTC 2007 | MWH Produced | KWH Produced | Value of PTC per KWH |
|---------------|--------------|-------------------|----------------------|
| \$666,000,000 | 27,700,000 | 27,700,000,000.00 | \$ 0.0240433212996 |

February 9, 2011

Joint Committee for Review of Administrative Rules

RE: PSC Wind Turbine Siting Rules

I am here today to express serious concerns about the Wind Siting Rules created by the Wisconsin Public Service Commission, and the effect it will have on well being of the citizens of Wisconsin. The regulating of wind turbines has been a contentious issue for some time, not only in Wisconsin, but the rest of the world as well. There is growing body of evidence that these industrial machines are not as benign as the wind energy advocates would have you believe.

The State Legislature passed a model wind ordinance (Section 66.0403) in the 1997-98 session with minimal discussion. Wind energy advocates, with little input from the public wrote this model ordinance. At the time, the largest wind turbines proposed for the State were less than 200 feet tall, and very few people envisioned the 400 to 500 foot turbines now being installed in Wisconsin.

The Wisconsin Legislature passed Act 40 which gave wind turbine siting authority to the PSC, and required them to develop State-wide rules for the siting of the turbines. The Legislature also mandated the formation of a Wind Siting Council to advise the PSC. However, the PSC stacked the Council with wind developers and wind advocates, and refused to consider other points of view.

The Public Service Commission proved once again that they are more accountable to the utilities than individual citizens, and are not a neutral player in the wind energy discussion.

The PSC has already approved several large wind turbine installations in Dodge and Fond du Lac and Columbia Counties, without regard to the impact these facilities have on the local environment. For example, the PSC did not consider recent scientific evidence suggesting that setbacks of less than 2640 feet from residences will not protect people. The National Academy of Sciences on a study released in May 2007 titled "Environmental Impacts of Wind-Energy Projects" recommended a minimum of one half-mile setback from residences to minimize noise problems. Instead, the PSC applied the industry driven standards from a model written by wind energy advocates that has no basis in any scientific or medical data.

There has been a lot of talk about the need to have thousands of wind turbines in Wisconsin to stimulate the economy and create jobs. There is no reason to believe that wind turbine manufacturing jobs will leave the State of Wisconsin if we don't put up thousands of wind turbines. That logic would require Wisconsin to buy all the trucks produced by Oshkosh Company, or all the paper produced by the paper industry in the State.

The fact is, wind turbines will stifle growth and jobs in Wisconsin. The attached page is a planned industrial wind turbine complex in the Township of Brothertown in Calumet County. The developer, Midwest Wind Energy wants to put 52 turbines in this 16 square mile area. The circles represent the turbine locations based on data from the FAA web site. The Brown dots represent existing homes and businesses. As you can see, there is very little land left to build a house on, or even expand an existing business. Of course, this assumes that someone would actually want to live and work about 1,000 feet from a noisy, 500 foot moving structure. The developer has repeatedly called this phase one of several. One can only imagine where they will stuff even more turbines in this congested area.

This density of turbines is not unique to Brothertown. The wind developers have convinced their friends on the PSC that turbines need to be closely spaced to make the project economically viable for them. What about the existing residences and businesses? The PSC has abdicated their responsibility to the citizens of rural Wisconsin in favor of the big wind developers, many of which are owned by foreign companies.

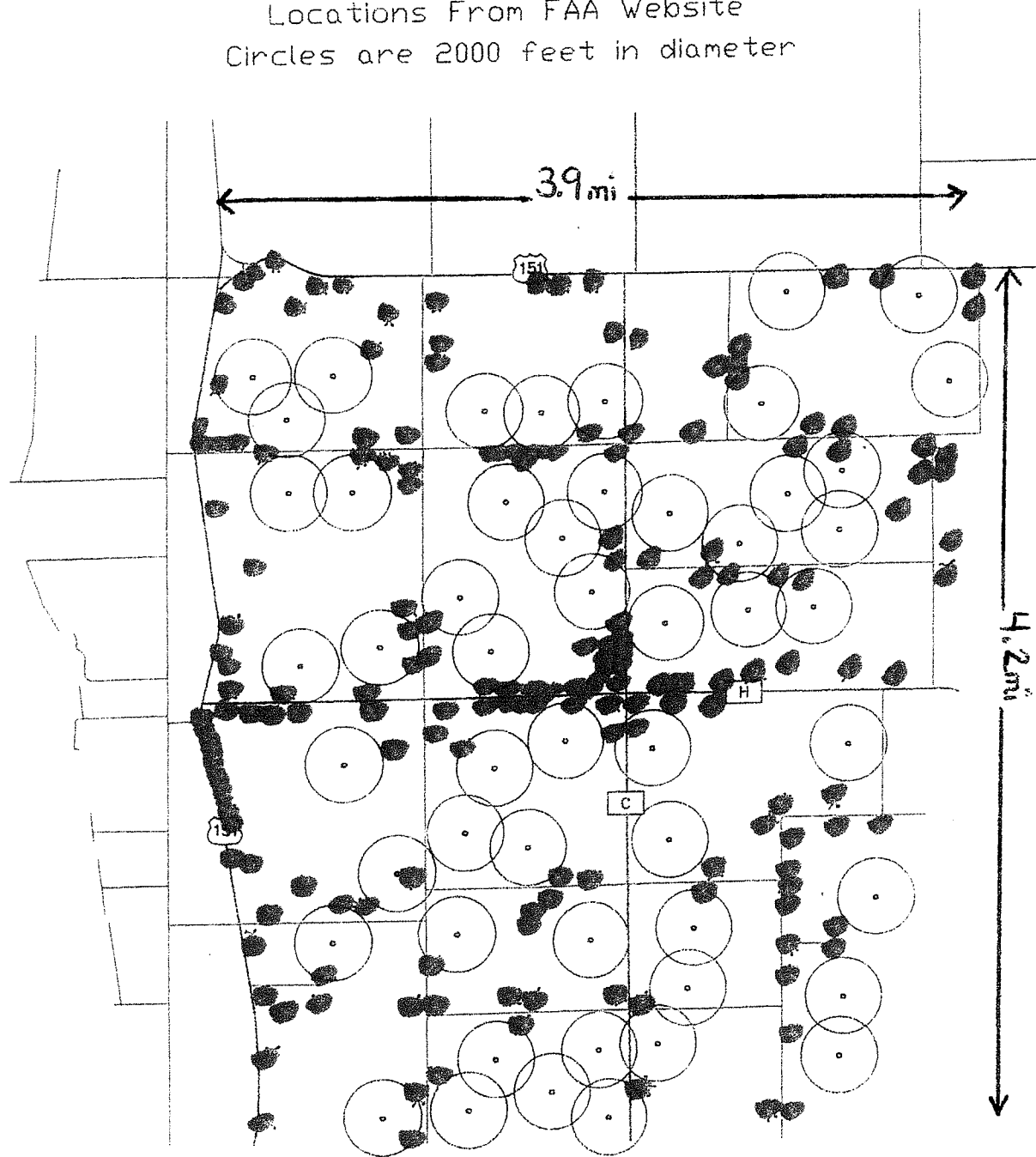
Decisions made by this Committee and the Legislature will affect the people of this State for at least thirty years (the expected life span of a wind turbine). This decision must be reasoned and carefully studied to protect future generations, and the rural environment of Wisconsin. You must not rush this proposal through the legislative process.

Implementing the proposed PSC wind siting rules will only benefit the wind energy companies, not the majority of your constituents. I urge you not to compound the mistakes made by the PSC, and do the responsible thing for your constituents. You must object to these wind siting rules and allow a reasoned, rational approach to this issue.

Thank you,

Ervin Selk
W4821 Dick Road
Chilton, WI 53014

Proposed Brothertown, WI Industrial Wind Factory Layout
Locations From FAA Website
Circles are 2000 feet in diameter



Disclaimer: to the best of our knowledge these proposed turbines are accurate.
They are mapped according to the latitude and longitude locations from the FAA website.

52 TURBINES

PSC 128 Wind Siting Rule

To: Joint Committee for Review of Administrative Rules

Fr: Gary Haltaufderheide
2222 Wisconsin Avenue
Sun Prairie, WI 53580

Position: **Support PSC 128 Wind Siting Rule**

Date: February 9, 2011

Summarization of My Letter to Governor Walker Dated January 27, 2011 **(Attached)**

I have been an advocate for energy conservation & renewable energy

In the late 1980's former Governor Tommy Thompson made the following statement

“There is no issue more crucial or critical to Wisconsin future right now than energy. We're running out of it. Plain & simple.”

My past tours to Iowa & Minnesota

During my recent tour to Greensburg, Kansas I saw a 50 kw wind turbine outside their local hospital (about 300 ft from the building).

We have reached a world population of over 7 billion. By 2030, the world will consume 60% more energy than today. And while the demand for energy grows, the supply of fossil fuels will not.

Providing energy to the needs of a growing population will require many people working together.

We need leaders like you to step forward and have the vision and commitment to face the challenges of the future energy needs not only for Wisconsin, but the Midwest, the country, and the world.

We need your support for PSC 128 and we also need your leadership & vision

Conclusion

If we are going to create 250,000 new jobs in the next few years, we are going to need a balance of fossil fuels & sustainable alternatives to meet the demands for energy. As former Governor Thompson said, “Plain & Simple.”

January 27, 2011

Governor Walker
Governor's Office
115 E. State Capitol
Madison, Wisconsin 53702

Re: Proposed Legislation on Administrative Rule-Making & the Wind Siting Rule

Time for Leadership with Vision

Dear Governor Walker:

I have been an advocate for energy conservation and renewable energy for the past twenty five years. During the early 1980's I was involved in several statewide energy conservation programs which met a lot of resistance from both the residential and commercial sectors. Today, those same energy conservation programs have become part of our daily lives in our homes and the places we work.

About ten years I began to study and evaluate the technologies of renewable energy with my focus on wind. Here was a source of energy that was clean and I use the word free or maybe a better expression, "a gift from God." Yes, even at that time there were articles about health concerns, so what I did was to travel to western Iowa and Minnesota. I not only toured the wind farms, but I talked to people from all walks of life (farmers, teachers, housewives, business people, retired people, etc.). Never did I receive a negative statement pertaining to wind energy. Many felt they were blessed to receive their power from wind. My most recent visit was to Greensburg, Kansas which was almost totally destroyed by a tornado. In their re-building efforts they have embraced wind power plus energy conservation programs. In fact, they have a 50 kw wind turbine outside their community hospital (about 300 ft from the building). All of my discussions with the hospital personnel have been positive. Actually, one person stated that the city government is encouraging more installation of wind turbines throughout the community.

Governor Walker may I asked you to take a few minutes to re-think the benefits of wind energy & other alternative sources of energy not only in the state of Wisconsin, but globally. We have reached a world population of over 7 billion, the challenges facing humanity have never been greater. The earth's population will increase by 150,000 people per day for the next 40 years. By 2030, the world will consume 60% more energy than today. And while the demand for energy grows, the supply of fossil fuels will not. Fortunately, the solutions to many of the most fundamental challenges can be found in science. But providing energy to the needs of a growing population will require more than science alone. It will require many people working together. People who can collaborate across borders, companies, governments, organizations and cultures to devise solutions-both large & small- that improve the lives of people in Wisconsin and around the world.

We need leaders like you to step forward and have the vision and commitment to face the challenges of the future energy needs not only for Wisconsin, but the Midwest, the country, and the world. Wind energy is not the total solution, but it is a step forward to help make possible the transition from fossil fuels to more sustainable alternatives. Today, through the evening, and tomorrow scientist and engineers will constantly direct their expertise to find solutions, but they need leaders with vision. Governor Walker are you that leader?

I would appreciate an opportunity to share my vision with you.

Sincerely,

Gary Haltaufderheide

Address:

2222 Wisconsin Ave.
Sun Prairie, Wisconsin 53590

608-825-4581



14 Marsh Court • Madison, WI 53718-8805 • Phone 608-222-0105

P.O. Box 7428 • Madison, WI 53707-7428 • Fax 608-222-0230

February 9, 2011

Attention: Public Hearing Committee – PSC 128

Good Morning;

I'd like to thank the committee for allowing this opportunity to speak on behalf of the Wind and Renewable Energy industries and in support of PSC 128 as approved and amended in December 2010.

My name is John Desens and I am with Westphal & Company. Westphal & Company is an electrical contractor headquartered in Madison, WI with branch offices in Janesville, WI and Dubuque, IA.

Westphal employs many trades' people throughout the state of WI, many of which have been laid-off for several months and in some cases in upwards of one year. Renewable energy projects, in particular Wind Energy, are an opportunity for our company to create lots of jobs. These are good paying jobs located right here in our own backyard. These are jobs that Wisconsinites need and cannot allow to disappear or go elsewhere.

On a typical Wind project, at any one time we could employ electricians working inside the tower installing cable, trenching the cabling for the collection system between the towers, and working on the substation. In some cases these projects will last several months or in upwards of one year. Thus guaranteeing a regular income for those fortunate enough to work on one of these great projects.

Again these projects create good paying jobs. Jobs for Wisconsin families. Any regulation which prohibits the development of these projects here in Wisconsin effectively kills the job creation process that is desperately needed to support our local economy.

Respectfully Submitted;
WESTPHAL & CO., INC.

John C. Desens
Director – Business Development
idesens@westphalec.com
www.westphalec.com

February 9, 2011

Attention: Joint Committee for Review of Administrative Rules (JCRAR)

Representative Jim Ott, Co-chair

Senator Leah Vukmir, Co-chair

Subject: Suspend the PSC wind siting rules

I am writing this letter to ask the JCRAR committee to suspend the PSC wind siting rules set to take effect March 1, 2011.

I have been involved with this issue for the past 6 years. How much more of my life, my time, my money do these wind developers take. I am a citizen of this state and my government should not be compromising my health and safety along with giving the use of my property to a business which I feel cannot sustain itself. I cannot understand why health and safety as well as property rights are being compromised with the current PSC rules. The setbacks should be from a property line and not a home. The setback from a property line should be at least 2640 feet to protect the nonparticipating property owner.

I felt the wind siting committee as well as the PSC were only concerned with making turbines easier to site in Wisconsin. These are huge industrial wind turbines being placed haphazardly among homes and property. I have "nuclear in my back yard". The nuclear plant is highly regulated by the NRC. The current PSC rules allow the turbine owners to keep their own log of complaints and come to a "reasonable" solution. The way the PSC has written the rules the persons that commits the offense gets to determine how they are going to resolve and also track the problem. A third party needs to be involved. This is the proverbial, fox guarding the henhouse. These wind projects produce power that cannot be stored, is not available much of the time, and costs the taxpayer dearly.

I have requested information and submitted written questions multiple times to the PSC and have not gotten answers to all of the questions. I have also submitted in writing some of these same questions to turbine developers (Element Power, Emerging Energies- one of the Emerging Energies Partners, (Bill Rakocy) was a member of the wind siting council) some of these same questions and have not received answers. I have received elusive responses or none at all to some of the questions. I have listed below the questions of which I would like answers to:

Question: Why are there no limits on low frequency noise in the PSC rules?

PSC did not answer this question.

Question: What is the technical supporting documentation for the setback distances?

I believe the 1.1 times the height of the turbine distance set back has no basis. I was told to look at the Glacial Hills report. I could not find any information on the technical basis in the Glacial Hills report.

I believe the 3.1 times the height from a residence also has no basis. I was told to look at the Glacial Hills report. All that was found was an economic determination on the number of turbines that could be placed using this setback. This does not answer the question about the technical basis of the distance.

Question: What was the rational for measuring from a residence verses the property line?

No answer was provided to this question by the PSC.

Question: Does the PSC have a debris throw distance for a blade failure associated with uncontrolled turbine operation as a result of a brake failure and supporting calculation from turbine manufacturer?

No answer was provided to this question and no manufacturer calculations were provided.

Question: Does the PSC have the blade throw distance at normal operating speed and supporting calculation from manufacturer?

No answer was provided to this question and no manufacturer calculations were provided.

I also question whether or not the PSC did an environmental impact statement.

I don't understand: why don't the wind developers openly answer questions since they claim this "green" energy is good. Why are they keeping things so secretive? What are they trying to hide? I believe that landowners who lease their land to a turbine developer have a gag order written into the contract. What are they trying to keep quiet? Usually people are allowed to speak freely if a product or idea is so good. I feel these turbine developers are offering a mere pittance back to the community for the short and long term damage they are doing..

One last question, if there were two identical houses for sale for the same price on two identical lots, but one house had 500 foot turbines 1250 feet from the house and turbines any direction you looked, which house would you buy?

Please suspend the PSC rules and look at placing health and safety along with property rights ahead of what I feel is an unregulated irresponsible wind turbine industry. Send the rules back to the PSC to do what Act 40 was intended to do: promulgate rules that protect Wisconsin residents.

I would like this letter to be included as part of the record.

Respectfully,



Anita Roberts, 12113 Tannery Road, Mishicot, WI 54228

920-755-2736

To: Joint Committee for the Review of Administrative Rules (JCRAR)

From: Michael J. Exum,

Re: Clearinghouse Rule #10-057; PSC Wind Siting Rules proposed Chapter 128

Date: February 9, 2011

"It is difficult to get a man to understand something, when his salary depends upon his not understanding it!" Upton Sinclair

Dear Honorable members of the Joint Committee for Review of Administrative Rules,

I write asking you to take action to stop the implementation of PSC 128 (CR 10-057) and once stopped, to rewrite the rules in a responsible manner, taking into account the legitimate issues raised in the Wind Siting Council's minority report and at the Senate public hearing on Clearinghouse Rule 10-057, some of which I outline below.

There are a multitude of reasons to rewrite the wind siting rules, but underlying each of them is the PSC's flawed Wind Siting Council's make-up, which ultimately led to wind siting rules that do not adequately protect the public, do not adequately protect the environment and will do little towards meeting the wind industry's stated goal of reducing carbon emissions from coal-fired power plants. The 15-member (16 if council "volunteer" member from Foley & Lardner, wind industry Attorney Elizabeth Hanigan is counted) Wind Siting Council had 8 members (a voting majority) who make their living off the taxpayer-subsidized wind energy business. Of those 8, at least 5 are members of Renew Wisconsin, a wind energy business lobbying group. Of those 5, two work directly for Renew (Renew Lobbyist Michael Vickerman & then Renew President, Jennifer Heinzen).

Wisconsin has over 5 million people living in it, but yet our government, when charged with finding 15 people to represent the entire state on an issue that will indelibly change our rural environment, chose 5 of those 15 from a single wind industry lobbying group out of Madison - Renew Wisconsin. At a time when citizen's faith in their government is waning, how a governmental, rule-making body could so blatantly stack the deck with self-serving wind energy interests, is beyond the pale.

Inadequate health protections: The majority of council members' financial interest in quickly building as many turbines as possible in Wisconsin prevented them from understanding the legitimate health concerns of citizens caused by placing turbines too close to homes. Although not addressed by the majority of Council members, PSC Commissioner Lauran Azar acknowledged the problem in her

comments regarding the siting rules. Unfortunately, the issue was not adequately addressed in the final rules. Fortunately, you have the opportunity to remedy that error with the suggested 1800 ' setback in Governor Walker's latest bill.

Environmental Problems: Even though the legislature required two environmentalists be represented on the council, the two chosen, Michael Vickerman and Ryan Schryver were both registered lobbyists who represent the wind industry (see WI Government Accountability Board). This conflict of interest prevented them from understanding the importance of WE Energies' Greenfield/Blue Sky Post-Construction Bat and Bird Fatality Study (WE Energies is a member of Michael Vickerman's Renew WI). In this study, conducted by We Energies (independent studies have not been allowed) the utility's own, underestimated bat kill rates are shockingly high, as the DNR states in a letter to WE Energies, "The bat fatality rate at BSGF is similar to the highest values observed to date in the United States, and exceed the estimates presented by the Department and We Energies before the PSCW during technical testimony for this project" (PSC Ref# 127878, 3/4/2010). Based upon the study result, the estimated number of bats killed annually at the 88-turbine facility is upwards of 3500. If the heavily wind industry-influenced siting rules are left to stand as they are, and turbines continue to be built towards the wind industry's lobbied-for renewable portfolio standard objective of 5,562 GWh with up to 15,000 wind turbines, the bat deaths would climb to a staggering 600,000+ per year. The legitimate threat to bats from wind turbines, coupled with the threat from White Nose Syndrome poses a serious risk to the survivability of the species that neither "environmental representative" on the Wind Siting Council could see from their wind industry-lobbyist perspective. It is an exercise in Orwellian verbal gymnastics to speak of "protecting" the environment, while in actual deed acting in a manner that destroys it.

Property rights. The citizens of rural Wisconsin have followed the rules as they've built their homes and lives in their respective rural areas. Many have put their life's effort and savings into their homes. But now, through the heavy influence of financially-motivated wind energy groups and their over-simplified, unsubstantiated claims that wind turbines will solve our carbon emission and energy problems, the rules of rural life are being hastily rewritten. And worse, the citizens most impacted are left out of the process. Gone, with the PSC's rule that a turbine can be placed 500 ft. from a property line but 1250 ft. from a house, is the right of enjoying one's own property. Given the current PSC rules, a turbine can be placed in such a manner that an owner would be prohibited from building or planting trees on their own property. If a founding father had been asked if it might be permissible that in the future the pursuit of profits and greed would trump an individual's right to use their own property, it is doubtful the founding father would have approved. But again, the Wind Siting Council majority's industry driven perspective prevented an understanding of the basic, fundamental American value of private property rights. Consequently, if you live in a rural area, have followed the rules, have invested your life's work in your home & property, the rules have changed, and you are now unprotected and at risk of losing the right to use, enjoy and do well by your own property.

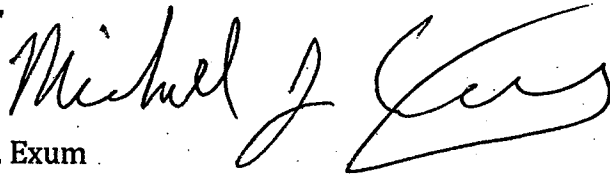
Please stop the PSC wind siting rules from taking effect and take the time to reestablish fairness by giving rural Wisconsin citizens their private property rights back.

There may be legitimate reasons for having state-wide, uniform rules. However, as the opportunity for local citizens to participate in the wind siting process is decreased (as happened when the state took away from our local units of government the right to site wind turbines), there are equally legitimate and entirely necessary reasons to ensure the integrity of whatever new process is developed. Loading rule-making committees with members on a single side of any issue does not instill a sense of integrity for the process. Furthermore, a one-sided, self-serving rule making body ultimately leads to a poor outcome, as evidenced by the PSC rules that do not adequately protect citizens, the environment, or the tax payer's pocket book.

Please stop the PSC's wind siting rules from being implemented on March 1, and give the citizens of Wisconsin a new set of rules that do not diminish our property rights, put us in harms way or destroy our environment in the name of saving it. Wisconsin citizens deserve better, and, for an energy policy to be truly effective and sustainable, we must do better.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael J. Exum". The signature is fluid and cursive, with a large, sweeping "M" and a long, horizontal stroke at the end.

Michael J. Exum
17532 CTH C
Evansville, WI 53536
608-882-3986

WHAT HAVE I DONE?

Now each morning when I awake, I pray and then ask myself, "What have I done?"

I am involved with the BlueSky/GreenField wind turbine project in N.E. Fond du Lac County. I am also a successful farmer who cherishes his land. My father taught me how to farm, to be a steward of my fields, and by doing so, produce far better crop production. As I view this year's crops, my eyes feast on a most bountiful supply of corn and soybeans. And then my eyes focus again on the trenches and road scars leading to the turbine foundations. What have I done?

In 2003, the wind energy company made their first contacts with us: A \$2000 "incentive" started the process of winning us over, a few of us at a time. The city salesman would throw out their nets, like fishermen trawling for fish. Their incentive "gift" lured some of us in at first. Then the salesmen would leave and let us talk with other farmers. When the corporate salesmen returned, there would be more of us ready to sign up; farmers had heard about the money to be made. Perhaps because we were successful farmers, we were the leaders and their best salesman. What have I done?

Sometime in 2004 or 2005, we signed \$4000.00 turbine contracts allowing them to "lease" our land for their needs. Our leases favored the company, but what did we know back then? Nobody knew what we were doing. Nobody realized all the changes that would occur over which we would have no control. How often my friends and I have made that statement! What have I done?

I watched stakes being driven in the fields and men using GPS monitors to place markers here and there. When the cats and graders started tearing 22 foot wide roads into my fields, the physical changes started to impact not only me and my family, but unfortunately, my dear friends and neighbors. Later, a 4 foot deep by 2 foot wide trench started diagonally across my field. A field already divided by their road was now being divided again by the cables running to a substation. It was how making one large field into 4 smaller, irregularly shaped plots. Other turbine hosts also complained about their fields being subdivided or multi cable trenches requiring more land. Roads were cut in using anywhere from 1000 feet to over a 1/2 mile of land to connect necessary locations. We soon realized that the company places roads and trenches where they will benefit the company most, not the land owner. One neighbor's access road is right next to some of his out buildings. Another right next to his fence line. What have I done?

At a wind company dinner presented for the farmers hosting the turbines, we were repeatedly told -- nicely and indirectly -- to stay away from the company work sites once they start. I watch as my friends faces showed the same concern as I had, but none of us spoke out. Months later, when I approached a crew putting in lines where they promised me they would definitely would not go, a representative told me I could not be here. He insisted that I leave. The line went in. The company had the right. I had signed the lease. What have I done?

Grumbling started almost immediately after we agreed to a 2% yearly increase on our 30 year lease contracts. Some felt we should have held out for 10%. What farmer would lock in the price of corn over the next 5 years, yet alone lock one in at 2% yearly for 30 years? Then rumors leaked that other farmers had received higher yearly rates, so now contracts varied. The fast talking city sales folk had successfully delivered their plan. Without regard for our land, we were allowing them to come in and spoil it. All of the rocks we labored so hard to pick in our youth were replaced in a few hours by miles of roads packed hard with 10 inches of large breaker rock. Costly tiling we installed to improve drainage has now been cut into pieces by company trenching machines. What have I done?

Each night, a security team rides down our roads checking the foundation sites. They are checking for vandals and thieves. Once, when I had ventured with guests to show them foundation work, security stopped us and asked me, standing on my own property, what I was doing there. What have I done?

Now, at social functions, we can clearly see the huge division this has created among community members. Suddenly, there are strong-sided discussions and heated words between friends and, yes, between relatives about wind turbines. Perhaps this is of greater consequence than the harm caused to my land! Life is short and my friendships precious. What have I done?

I tried, as did some of the other farmers, to get out of our contracts, but we had signed a binding contract and a contract is a contract. If you are considering placing wind turbines on your property, I strongly recommend that you please reconsider. Study the issues. Think of the all the harm versus benefits to your land and, in the future, to your children's land by allowing companies to lease your land for turbines.

WHAT HAVE I DONE?

PLEASE DO NOT DO WHAT I HAVE DONE!

This was written by Don Bangert of Chilton after he interviewed a landowner who wishes to remain anonymous. The landowner approved this story.

Thank you for this opportunity to express my concerns.

I would like to comment on the process by which the Wind Siting Rules were developed.

It is widely perceived among those familiar with the wind siting rulemaking process that the process was far less than an objective, scientific inquiry, seeking to identify the real problems associated with siting large scale industrial wind turbines, and then formulating rules which provide for adequate protections for WI residents living near them. The public perception is that the process was pre-arranged, so as to make possible the creation of rules that would **somehow allow** for liberal wind turbine siting, even in relatively highly populated rural areas, and even though this may cause collateral damage to rural residents health, property rights, and property values. Current rules with setbacks of merely 1250' from a home, 1.1 times the height from a property line, and noise levels that are up to 4 times louder than pre-turbine nighttime noise levels, support these perceptions, especially in light of studies worldwide indicating that 1/2 mile is the **minimum** distance needed to avoid negative health effects.

The very composition of the Wind Siting Council made this outcome rather predictable, being heavily weighted with members who would benefit from, and therefore favor, liberal wind siting rules. The process is seen as severely flawed, being driven by special interests and political agendas while ignoring science, personal testimony from WI (including that of one Council member living in a wind project), and global testimony that industrial wind turbines, near to people, lead to serious problems.

The Wind Siting Council Minority Report also reflects these public perceptions. This 17 page appendix to the originally proposed wind siting rules goes into considerable detail in laying out the deficiencies of the process and its results. It was written by four of the members of the Wind

Siting Council, whose concerns and experiences were largely ignored in the final recommendations. No one is better qualified than these four men to give an inside look at how the process was conducted and why its conclusions are unacceptable.

Issues of concern discussed in the Minority Report include:

- The composition of the Wind Siting Council
- Health
- Noise
- Shadow Flicker
- Property Values

The report concludes with recommendations regarding:

- Health
- Safety Setback
- Property Values

Please carefully review the Minority Report. I can think of no better single document for understanding why the Wind Siting Rules need to be immediately suspended and how they need to be modified.

For your convenience I have provided 10 printed copies.

Thank you,

Jim Vanden Boogart
7463 Holly-Mor Rd.
Greenleaf, WI 54126

Thank you for calling this Public Hearing to listen to the concerns of WI residents, taxpayers, and voters.

The health and safety of WI residents needs to be the highest priority in the rulemaking process.

The Wind Siting Council claims that it does not have adequate evidence that industrial wind turbines are **unsafe** for those living near them. However, they also admit that they do not have evidence that industrial wind turbines are **safe** for those living near them.

There have been widespread health-related complaints from residents in existing WI wind projects. However, these complaints have not been given serious consideration. Council member Dr Jevon McFadden, at a meeting of the Brown County Board of Health, referred to these real life experiences as "self-reporting" and stated that such evidence is not considered to be reliable enough.

While dismissing these "self-reported" problems, WI has not chosen to put the issue to the acid test by conducting epidemiological studies in its existing wind projects. And, it appears that it does not intend to so, despite requests from a multitude of residents and towns.

Yet, lacking such real-life evidence, rather than follow the precautionary principle, Dr McFadden and the Council majority would have WI surge forward and address the problems later. He suggested that **when** people get sick from exposure to wind turbines, that they go to their doctor, and after the doctor has eliminated any other possible cause, that the doctor then voluntarily, at his own expense, report such findings to the county and state health departments. He further stated that after the State received enough such reports, adjustments could then be made to the rules. In a conversation following that meeting, Dr McFadden admitted that such reports were unlikely to be made voluntarily. Of course, even if they were made and the

setbacks were increased, those living too close to existing wind turbines would continue to be victimized, unless the State required these to be shut down or moved farther away.

I will draw an analogy to illustrate the recklessness of this approach:

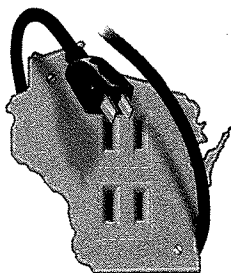
Imagine that the State decides to purchase a pond and open it up as a diving and swimming pool for its resident. It decides to **not** check for submerged rocks or logs, even though the seller of the pond has noted that former swimmers have reported such dangers. Instead, it decides that if enough people receive head injuries or broken necks, it will purchase a different, safer pond for new swimmers. However, the first pond must still be used by those who had been using it before, and the rocks and logs would not be removed.

Such a scenario would be hard to imagine in real life, yet this is how the Doyle appointed PSC and its self-appointed Wind Siting Council are proposing that WI proceed with wind development, forcing wind turbines to be placed where they simply don't belong. And it's not the *Not-In-My-BackYard* syndrome, because industrial wind turbines don't belong right up close to **anyone's** backyard where their health is threatened, their property rights are taken, and their property values are destroyed.

Please suspend the current harmful and irresponsible Wind Siting Rules so that residents' concerns can be examined objectively by scientifically qualified individuals who do not have a conflict of interest.

Thank you,

Barbara Vanden Boogart
7463 Holly-Mor Rd.
Greenleaf, WI 54126



CustomersFirst! *Plugging Wisconsin In*

TO: Members, Joint Committee for Review of Administrative Rules

FROM: Matt Bromley, Executive Director, *Customers First!* Coalition

DATE: 2/09/11

RE: Support PSC 128 – siting of wind energy systems

A Coalition

to Preserve

Wisconsin's

Reliable

and Affordable

Electricity

The *Customers First! Coalition* is an alliance of consumer organizations, municipal electric utilities, rural electric cooperatives, wholesale energy providers, an investor owned utility, renewable energy advocates and labor organizations.* We come together out of a shared interest to preserve Wisconsin's reliable and affordable electricity.

This wind siting rule, PSC 128, is the result of 2009 WI Act 40 that passed last session with strong bipartisan support. The *Customers First! Coalition* supported Act 40 and support the rule before you today because we feel that having workable statewide uniform siting standards will help hold down costs for electricity ratepayers as the state moves towards meeting its renewable energy goals.

PSC 128 was developed through an inclusive, transparent, and fact-based process that balanced the interests of many stakeholders. The rule gives clear direction to local governments on the procedures and standards for siting wind energy systems in their communities, and should help avoid the delays, litigation and regulatory burden that have plagued many projects and have saddled them with additional and significant costs – costs that are ultimately passed on to the ratepayers of this state.

If the rule is not allowed to become effective, we're concerned that there will be very real negative implications for the development of cost-effective renewable energy projects in our state. At a minimum, it would lead to a loss of construction and manufacturing jobs. It would also deny potential host landowners and municipalities here the opportunity to generate supplemental income as project hosts.

For more information, contact Matt Bromley, Executive Director, *Customers First!* Coalition, Ph: 608-286-0784; mbromley@customersfirst.org

*Founding members of the *Customers First!* Coalition include the Municipal Electric Utilities of WI, Cooperative Network, WPPI Energy, IBEW Local 2150, Madison Gas & Electric, Dairyland Power Cooperative, Citizens Utility Board, and RENEW Wisconsin.

14 West Mifflin Street

Suite 310

Madison, WI 53703

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Forest Township
Feb. 8, 2011

Dear Sirs,

We need your support in objecting to the PSC rules that allow a 1250 foot setback of wind turbines from our homes.

There are so many health, safety, property value and quality of life issues that I feel these issues should be addressed before more turbines are erected in Wisconsin. These turbines are being discontinued because they are not efficient. More research needs to be done on wind energy.

Thank you for your consideration.

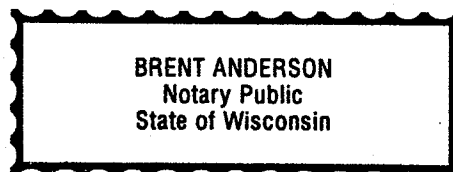
Dale L Logan

2880 Ctp Rd Q
Clear Lake, WI
54005
715-263-2711

Sworn before me

Feb. 8, 2011





My Commission Expires 2/28/13

**Public Hearing: Joint Committee for Review of Administrative Rules
PSC 128 (CR 10-057) Relating to the siting of wind energy systems**

Senator Leah Vukmir, Senate Chair
Representative Jim Ott, Assembly Chair

My name is Betty Wolcott. I am a Sister of St. Francis of Assisi and live near Osseo, Wisconsin where I am director of a small land preserve. I serve on Trempealeau County's Wind Ordinance Committee. We completed our county ordinance governing the siting of wind turbines in November of 2007 and the county board approved it in December of 2007. I have testified here and elsewhere many times concerning the research, conferences, visits to wind farms and conversations with those living near them, that culminated in our wind ordinance for Trempealeau County. Of course we opposed a state-wide law to impose uniform wind turbine siting rules since Wisconsin is so varied in its terrain and neighborhoods. Also, many of our counties and townships had taken seriously Wisconsin's Smart Growth initiative to promote sound land use planning and zoning that are appropriate for our areas and reflect the will of local citizens. All of this has been ignored just as our testimony has been. We invited a critique of our ordinance based in ecology, science and lived experience but no one ever seriously responded. *It was dismissed as being too strict.*

I am appalled and saddened by this whole process. Why, if we wanted to reduce greenhouse gas emissions, wouldn't we do an environmental assessment of what is possible and does no harm. And why wouldn't we require that homes and businesses in areas that would receive clean energy be made energy efficient and retrofitted so energy wouldn't just be wasted. Doing this first would also give us an idea of just how much energy is needed and would create a lot of jobs and boost small businesses. And we could think of other ways wind energy might be supplemented, for example, by solar panels. My little solar chime works just fine when there is no sign of the sun.

The proposed PSC rules for siting wind turbines are unacceptable. The distances of wind turbines from homes and property lines are much too short and undermine health, safety and good living. The rules take away citizens' rights. I hope you will consider other voices that care and have worked long and hard to keep Wisconsin healthy, strong and beautiful. The present PSC rules are unworthy of the citizens and natural areas of Wisconsin. *We can do better.*

and should be suspended.

Thank you.

Betty Wolcott, OSF
N47475 Woodland Lane
Osseo, WI 54758 (715) 597-2711

Betty Wolcott - also speaking for The Director of The Office of Justice, Peace and Integrity of Creation for the Sr. of St. Francis of Assisi.

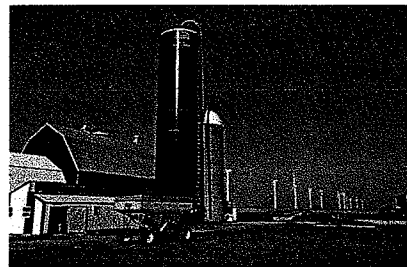
February 10, 2011

Kewaunee, Red River and Montfort landowners reflect on living next to a wind farm

By Mark Hirsch, 2076 Airport Road, Platteville, WI 53818

Emerging from the corn and soybean fields like a row of majestic trees, 20 wind turbines dominate the horizon along Highway 18 in Montfort, Wis. In this small town historically supported by agriculture, a wind farm is harvesting a different type of crop.

Owned by FPL Energy, the Montfort Wind Energy Center produces enough electricity to power approximately 9,000 average Wisconsin homes. When they went online in 2001, they were among the largest turbines manufactured in the U.S.



Don Leix farm, Montfort Wind Energy Center, WI

Sitting at the lunch counter of the Tower Junction Restaurant across from the wind farm, Laverne Clifton reflects on the impact the FPL Energy wind farm has had on this small community in Southwestern Wisconsin. "When they first came to me about installing windmills on my property, it seemed too good to be true. Now it's just another good cash crop you don't have to worry about. You don't plant it, and it uses little land," said Clifton, a retired farmer who has three turbines on his property.

Whether they have turbines on their property or not, Clifton's neighbors share a similar sentiment. Evelyn Mueller, 82, lives next to three of the Montfort Wind Energy Center turbines and says, "I'm all for it. We should use our natural resources. They are not noisy. I don't think anyway. At night when it's quiet, it's a quiet swish. It almost lulls you to sleep."



From her patio, Evelyn Mueller can see three of the Montfort Wind Energy Center turbines. Mueller said, "It has absolutely no impact on my quality of life."

The Montfort site generated little controversy. Clifton could only remember one person initially opposed to the project because they were concerned it would scare their horses when riding near them. Seven years later, Clifton can think of no one who opposes them.

According to FPL Energy, owners of the Montfort Wind Energy Center, wind is the fastest growing renewable energy resource in the world. Supporters promote wind energy as a nonpolluting resource that

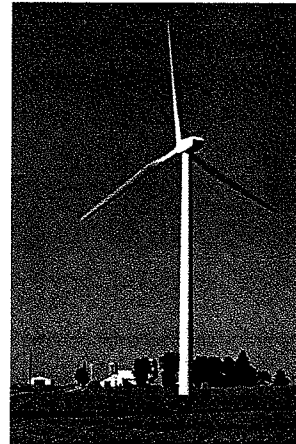
can supplement other energy sources reducing our dependence on fossil fuels.

Montfort residents like Larry Johnsen understand and appreciate the value of wind energy. Johnsen who has three turbines on his property says, "Everyone wants to turn on a light switch and have electricity. I mean do we want another coal plant? Look at how many electrical devices we use today, cell phones, ipods, you name it."

Down the road from the Johnsen farm, Jen Thomas moved next to the wind farm in 2005.

"I can see the windmills from all four sides of my house and I'm not getting a paycheck from the power company so I don't have to say nice things, but the windmills don't bother me," said Thomas. Visiting homes along the wind farm site, it was difficult to find anyone who opposes or has any concerns about its impact on their quality of life.

Jonas Gingerich, an Amish farmer who operates a goat dairy operation beside the wind farm currently has his farm listed with a local real estate company. Gingerich does not use electricity supplied by the public power grid. Because of rules dictated by his Amish lifestyle, his electricity comes from a diesel-powered generator that operates belt driven equipment. Regarding his proximity to the windmills, he said, "The windmills won't have anything to do with my farm sale. In fact, I wish I had one on my land."



Turbines at the Montfort Wind Energy Center blend in well with the Larry Johnsen farm. Johnsen has three of the wind turbines on his property and farms up to the base of each tower.



Horses on the Jonas Gingerich farm graze in a pasture near the Montfort Wind Energy Center. Commenting about the windmills, Gingerich said, "I seldom hear them. They make no noise hardly at all. I hear the highway more than the windmills."

Acceptance of wind farm projects across the country has varied greatly. While the Montfort Wind Energy Center went up without much fanfare; other Wisconsin sites have generated more controversy. Two wind farm projects in Kewaunee County, Wis. initially generated significant opposition.

Visual impact as well as health and safety issues are among the concerns raised by wind energy opponents. Additionally, flicker, noise concerns and perceived reduction in real estate values dominate arguments against wind farms.

For residents of Red River and Lincoln in Kewaunee County, Wis., the meetings leading up to passage of conditional use agreements were divisive. Jule Famaree, 81, a Red River board member for 41 years said at the meetings, "Some was for it, some was against it. But now, eight years later, most are ok with it."

Life near wind turbines is what you make of it according to Rich Lohrey. Lohrey's home is the only residential dwelling on Cedar Road and sits in the middle of the 14 Wisconsin Public Service wind turbines at the Lincoln Wind Energy Facility.



Mary and Rich Lohrey, Algoma, Wis. Live in the only residential dwelling on Cedar Road near the WPS wind farm. They purchased their home after the wind farm was in operation and say they are very comfortable living beside the wind farm.

In the five years they have lived in the shadows of the Lincoln wind farm, they have responded to questions about all of the usual wind farm complaints. "Lots of folks stop to ask us about them if they will have them in their area. They want our thoughts about them," Rich said, adding, "The wind farm doesn't bother me, I think it's great."

Rich and Mary have heard all the horror stories about problems associated with windmills from noise issues to reduced property value. "They can't say they make that much noise because they don't. We lived next to Lake Michigan for nine years; if you want to hear noise, live next to the lake. We wanted a country place with buildings for our toys. The windmills had no impact on our purchase price, none at all," Mary said.

The issue of flicker or strobing caused by sunlight passing through the rotating blades is a very real problem depending on location of the turbines. It is also a problem that can be avoided when turbine installations are properly sited. For some residents, flicker is tolerable, for others, it can cause serious concerns.

"We have it very early in the morning in our bedroom. It's only like twice a year for a very short time. I can't even complain about that," says Mary Lohrey.

The impact of wind farms on wildlife, specifically bats and birds is often identified as another problem. Rich Lohrey is quick to dispel the fear of bird deaths saying, "As far as killing birds, I've walked around them many times and never seen a dead bird yet."

For wind farm construction, there are currently no standard guidelines for setbacks from dwellings. Many opponents feel there should be a minimum setback of 1000' from an occupied dwelling.

Another concern raised by opponents involves doing business with the energy companies. According to residents around the Montfort, Red River and Lincoln energy sites, the power companies have been responsible business partners and good neighbors.



An access road leads to turbines in the WPS wind farm off of Pheasant Road at the Town of Lincoln in Kewaunee County, Wis. The turbine roads double as field access for farm equipment.

Lonnie Fenendael operates a 700 head dairy operation near the Lincoln wind farm. He also has five of the WPS wind turbines on his property and rents additional cropland from Jeff and Wallace Pelnar who have the other nine WPS turbines on their property. He plants crops right up to the base of all 14 WPS turbines.

When his family was approached by WPS, Lonnie said, "They were a local company and wanted a contract. There were a lot of things I wanted too, like putting the turbines in a line if possible. They were very good about working it out. We negotiated on price and any land damage. They pay for damage to crops, etc. They are very good about it."

Several miles away at the MG&E Kewanee County Wind Farm, Kevin LeFevre had a similar experience. "They treated us good on everything. It was a good business deal for us. They altered the access road to satisfy us."

Opponents fear the impact construction of wind farms will have on roads and infrastructure. As a town board supervisor, LaVern Clifton is very happy with his experience. During construction of the Montfort wind farm, "They were very good about correcting any damage to roads, land, etc. The company paid the township for the cost of road repairs, etc. They bent over backwards to make things right," said Clifton.

As a landowner, Clifton has no regrets about his business relationship with the owner of the wind farm. "As neighbors, we don't even know they are around."

Wisconsin is rated as one of the top 20 states with the highest wind energy potential. Based on a report published by FPL Energy, Wisconsin is capable of producing 58 billion kilowatt-hours annually. Despite opposition, the growth of wind power as an alternative to fossil fuel energy will continue in Wisconsin.

Don Leix, a farmer with three wind turbines on his property operates a 450 cow dairy operation near Montfort. Leix said, "We were skeptical at first, with the dairy and stray voltage, but we've had no problems." As far as impact on local real estate, "They have not affected anything here, its all good farm land."

When people ask Leix what he thinks about the wind turbines, he likes to ask them this question. "Do you use electricity?" Leix adds emphatically, "Nobody has told me no yet."



A turbine at the Montfort Wind Energy Center is framed by buildings on the Don Leix farm. Leix operates a 450 cow dairy operation, and is very happy with his business relationship with the owner of the wind farm.

My name is Mark Hirsch. I am a resident and landowner of Smelser Township in Grant County. Our township is the site of the proposed White Oak Wind Farm.

We have spent the last three years dealing with the challenges that accompany the siting of a wind farm.

I am here today to ask you to implement PSC 128, the reasonable wind siting rules that were developed by consensus in an open, fair and balanced environment last year.

Despite the governor's efforts to subvert this process with the help of this committee, I ask you to rethink this goal and implement PSC 128.

The rules as established by PSC 128 create a level playing field for developing our wind resources while still protecting the health and safety of our citizens and neighbors.

We have waited patiently during the process of drafting PSC 128. Now it seems that some of you want to ignore these rules and go backwards by putting the rule making process back into the hands of local government. That is a bad idea.

If you think accomplishing things at the capital is a challenge, you can't imagine the difficulty of legislating such a complex emotional issue at the town level? Town government's have no staff, limited resources, and they have the added challenge of mediating a very emotional issue with a small constituency made up of their friends, neighbors and relatives. It is much easier to enforce rules drafted in Madison than to write them.

The governor's plan to rewrite the rules essentially stripping landowners of the right to harvest their wind resource is an even worse idea.

Our town supervisors have been waiting patiently for the state and the PSC to empower them with a set of consistent wind siting rules like those in PSC 128.

Of our three board members, two support allowing the PSC and the appointed committee to establish wind siting rules that would then shield them from the decision making process. One town supervisor who was elected due to his opposition to the wind farm seems to prefer keeping control at the local level.

For 3 years now, the wind farm has been a contentious issue at our town board meetings. I can tell you that because of the emotional aspect of wind siting and the vast amount of misinformation on the Internet, we are no farther ahead than we were when the White Oak Wind farm was announced.

I'm on my towns Planning commission and as part of our comprehensive planning process, the Southwest Regional Planning Commission sent a non-partisan survey to every landowner in Grant County including those in our township.

One question on the survey specifically addresses renewable energy. The question asks if our county and townships should pursue energy alternatives like wind, solar and ethanol as a form of economic development?

In response to the pursuit of wind energy specifically as a form of economic development, 91% of the respondents strongly agree or agree that we should develop our wind resource. 4% disagree or strongly disagree, and 6% have no opinion.

Based on those responses, I would challenge each of you to recognize that developing our wind energy resource has strong community support. I think all of you would be surprised by the

outcome if the issue of supporting wind energy were actually put to a public vote.

Please take the time to review and consider this survey data when you make your decision. Hopefully this truthful data will inspire you to do the right thing by implementing the rules as established by PSC 128.

Thank you for your time.

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February 9, 2011

To: Members of the Joint Committee for the Review of Administrative Rules

From: Mortenson Construction

RE: PSC Rule 128

On behalf of Mortenson Construction, we respectfully request the Joint Committee for the Review of Administrative Rules not to suspend PSC Rule 128 relating to wind siting regulations.

Mortenson Construction entered the renewable energy market in 1995 and since, has become a leading builder of wind power projects in North America, capturing 25 percent of that market. Mortenson has been at the center of constructing nearly 100 wind power projects, totaling approximately 10,000 megawatts (5500 wind turbines) across the U.S. and Canada.

When Special Session Bills AB 9 and SB 9 were introduced, we were concerned with the ramifications of the legislation, which would effectively shut down the wind energy industry in Wisconsin. We are equally concerned the potential action to suspend PSC 128 could signal and create unpredictability in the market, driving investors and developers who depend on market stability out of Wisconsin. According to the American Wind Energy Association, there are over 3,000 Wisconsin residents currently employed by the state's wind industry, many of which could be put at risk should unreasonable regulations be mandated.

Thank you for allowing us the opportunity to comment on this matter and we respectfully ask that you allow PSC 128 to be implemented and give the rule an opportunity to work before seeking to make further modifications.

Sincerely,

A handwritten signature in black ink, appearing to read "M Sherry", is written over a horizontal line.

Mark Sherry
Vice President and General Manager
Mortenson Construction, Wisconsin Operations



W2874 Graylog Road
Iron Ridge, WI 53035
920-387-5840 - Fax 920-387-4734
info@wondraconstruction.com

February 9, 2011

My name is Roger Thimm. I'm the controller and part owner of Wondra Construction. We are a heavy/highway, underground utility construction company located in Iron Ridge and were involved in the construction of the Butler Ridge Wind Farm located in Dodge County in 2008. In 2009 and 2010 we constructed the Armena Mountain Wind Farm in Mainsburg, PA.

Currently we have 30 of our 35 employees on layoff while we look for new construction opportunities. We have been following the wind sitting rule process in Wisconsin for the past two years. The proposed 1,800 foot setback from a property line would have a negative impact on the construction of wind farms in Wisconsin. From our experience of working on and bidding other wind farm projects in other states we have seen a setback distance of around 1,200 feet from an occupied residence. The setback rule change from an occupied residence to a property line is a very big difference. In Wisconsin a rule like this is not required for any other type of construction project. Why is the wind industry being singled out? Would this rule be expanded if someone wants to build a new factory, farm expansion, industrial park, subdivision or home?

In regard to the new rule requiring an 1,800 foot setback from property lines I was wondering how was this number arrived at? Is this distance used in other states? Is this an industry standard? What the business purpose of this distance?

The PSC spent the last two years studying the wind energy sitting rules. They took into account input from all major stakeholder groups and had six rounds of public hearings. The rulemaking process was open, balanced and fair and will allow developers to site projects efficiently while protecting the public.

As passed the wind sitting rule will support economic development in the state by providing manufacturing, construction, operation, maintenance, development and transportation jobs. Wind energy is a major source of local revenue. Wisconsin's four largest wind farms paid around \$1.2 million to Fond du Lac and Dodge County landowners and almost \$1.6 million to local governments in 2010.

Unpermitted projects jeopardized by a possible suspension and alteration of PSC 128 represents 572 megawatts, \$1.5 billion in investment and approximately 1.6 million job-hours. Our employees would be directly impacted by this rule.

Suspending the rule now, before it has a chance to work, would send the worst possible signal for those considering investments in the wind industry in Wisconsin. We need to create regulatory certainty now to retain and capture the jobs created by this industry.

Sincerely

Roger W. Thimm
Controller



February 9, 2011

Wisconsin Joint Committee for Review of Administrative Rules
Public Hearing on PSC 128
Testimony of Beth Flaherty, Renewegy, LLC

My name is Beth Flaherty from Neenah, WI and I am a Renewable Energy Advocate with Renewegy, LLC of Oshkosh, WI. Renewegy is a manufacturer of 20 kw small wind turbines we like to call "urban turbines." Renewegy is exactly the kind of business our state is looking to nurture to create jobs and fuel economic recovery. The President of Renewegy, Jeff Ehlers, is the kind of entrepreneur and innovator that our state should be proud of and support. Through the vision and innovation of Jeff and his team, Renewegy has created 20 direct jobs since July 2008 and 100 supplier jobs. Renewegy conducts business with about 100 Wisconsin businesses and suppliers and has installed 25 turbines, with 23 of those being in The New North, such as SCA Tissue, Menasha Corporation and JJ Keller; and Renewegy is just getting started. Just take a drive through the Fox Valley to see the businesses that have invested in urban turbines. They are sprouting up in front of businesses along the Highway 41 corridor evidencing our thriving and progressive business environment.

It is in that exciting context of business development, innovation and growth that Renewegy asks you to allow the PSC 128 Wisconsin Wind Siting Rules to take effect. As I am sure you are all well aware, in order for a business to thrive in our state, it needs a fair and predictable regulatory system. That is what the Wind Siting Rules provide to Renewegy, other wind energy businesses and businesses they support. These Rules provide a statewide framework for these businesses to continue to grow and thrive and compete in the growing field of wind energy across our country.

Renewegy understands that there are many considerations when determining an appropriate site for a wind turbine and that each consideration should be given thorough and fair review. We are confident that the extensive work put into the PSC 128 Wind Siting Rules evidences an extremely fair and in depth process. These rules were 2 years in the making, developed by consensus in an open, balanced and fair process which included fact-finding, technical hearings, public hearings, an Environmental Impact Statement and advice from a 15 member advisory body. This is the kind of rule making our state should be proud of and Renewegy is confident the rules will protect all interested parties while allowing Wisconsin to compete in this innovative industry.

The number one priority of our state is economic growth and jobs, as it should be. Renewegy is doing its part to bring Wisconsin to the forefront in growing jobs in a critical new industry. We urge you to allow the Wind Siting Rules to take affect rather than stall such promising innovation and economic growth. Thank you.

Beth Flaherty
Renewable Energy Advocate
Renewegy, LLC
3650 Jackson St.
Oshkosh, WI 54901
920-385-0673
beth.flaherty@renewegy.com

My name is Jay Mundinger and I am a principal owner in Emerging Energies of Wisconsin, LLC and a wind developer in the Midwest. I have lived in Wisconsin for 35 years as have my two other partners Bill Rakocy and Tim Osterberg. We have a deep appreciation for our state and people that call it their home.

7 years ago my partners and I embarked on our journey as developers and have met many great people within communities, town leaders, manufacturing, construction and other services that we use to develop our project pipeline. I believe like anything different or unique, wind development has had its own set of issues with education of how a wind farm is developed, rule changes at every turn, and gossip that has slightly tainted our industry. In these 7 years my partners and I have had a conditional use permit approved and revoked for a smaller community wind project of 7 turbines, an approved 8 turbine community project just south of Green Bay, as well as 5 more projects in various stages of development. During that time we have had the privilege of working with many Wisconsin businesses including Michels Construction and Tower Tech. Our state does have a rich wind resource in specific areas that should be developed as part of our stewardship of harvesting the next generation of energy for Wisconsin and in order to provide employment and economic developments to our local communities.

The PSC 128 rulemaking process last year was open to all. There were no exclusions and anybody who was interested could have attended the meetings to gain a greater knowledge base of guidelines and processes. Several site visits were conducted of utility sized wind turbines along with an overview at each of the sites by the owner's representatives. Nothing should have been left unquestioned as there was always someone around that could offer a comment.

The guidelines in the PSC 128 are balanced and fair as both parties for and against wind development in the state had to make concessions along the way to find a middle ground. These balanced interests of host and non-host landowners should be given an opportunity to work as already a significant amount of time by the PSC and the public has been invested in the process. Protections for all landowners in the form of strict sound and shadow criteria will ensure safe setback distances and are stronger than states on our immediate borders.

The regulatory certainty that would be created by this rule would bring to the state continued job growth, increased revenues to local governments, manufacturing strength, and a long term positive outlook that would make Wisconsin strong for years to come. In the highly unlikely event that a problem does arise with the rule, the Public Service Commission and the legislature can always act to remedy those problems at that time.

The other day I had heard of the statistic that our great state ranks #5 in the country in coal importing from states like Illinois, Indiana, and Wyoming. Why do we continue to send jobs and dollars outside of our state when our economy is in need of stimulation and long term growth? These jobs that are created by the development of wind projects are long term and we do need to develop them in order to provide our state with clean energy for today and the future, to benefit local governments where the

projects are located, and finally to give landowners that are typically farmers who have always used wind for some type of power the opportunity to harvest an additional crop.

Emerging Energies respectfully urges this Committee to allow PSC 128 to go into effect on March 1st.

